16-B TRANSPORTATION IMPACTS: PLANT SITES AND CONVEYANCE

FINAL ENVIRONMENTAL IMPACT STATEMENT

Brightwater Regional Wastewater Treatment System

APPENDICES



Final

Appendix 16-B Transportation Impacts: Plant Sites and Conveyance

October 2003

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TABLE OF CONTENTS

1	PROJECT	T DESCRIPTION	1
	1.1 Over	VIEW	1
	1.1.1	Summary	2
	1.1.2	Study Area	
	1.2 STUDY	METHODOLOGY	3
	1.2.1	Traffic Impact Analysis	4
	1.2.2	Construction Truck Traffic Impact Analysis	5
	1.2.3	Employee Traffic Impact Analysis	6
	1.2.4	Transit Access and Routing	6
	1.2.5	Conflicts with Other Projects	6
	1.2.6	Emergency Vehicle Access	
	1.2.7	Bicycle and Pedestrian Access and Circulation	
	1.2.8	Cumulative Impact Analysis	7
	1.2.9	Conveyance Analysis	7
2	AFFECTI	ED ENVIRONMENT	8
	2.1 Regui	LATORY ENVIRONMENT	8
	2.1.1	Transportation System Justification and Classifications	8
	2.1.2	Level of Service Standards	9
	2.2 Routi	E 9 SYSTEM (PREFERRED ALTERNATIVE)	11
	2.2.1	Route 9 Treatment Plant	
	2.2.2	Route 9 Conveyance System—195th Street Corridor	
	2.2.3	Route 9 Conveyance System—228th Street Corridor	
	2.3 Unoc.	AL SITE	
	2.3.1	Unocal Treatment Plant	
	2.3.2	Unocal Conveyance System	
	2.4 Outfa	ALL ZONES	
	2.4.1	Zone 6	
	2.4.2	Zone 7S	70
3		5	
	3.1 Routi	9 Site (Preferred Alternative)	80
	3.1.1	Route 9 Treatment Plant	
	3.1.2	Route 9 Conveyance System—195th Street Corridor	92
	3.1.3	Route 9 Conveyance System—228th Street Corridor	
	3.2 Unoc.	AL SITE	116
	3.2.1	Unocal Treatment Plant	
	3.2.2	Unocal Conveyance System	
	3.3 OUTFA	ALL ZONES	
	3.3.1	Construction	
	3.3.2	Operational	
	3.4 CUMU	LATIVE IMPACTS	138
4		TION MEASURES	
		ATION MEASURES COMMON TO TREATMENT PLANT AND PORTAL SITES	142
	4.2 Routi	E 9—195th Street Alternative (Preferred) and 228th Street	
	ALTER	NATIVE	
	4.2.1	Construction	
	4.2.2	Operation	
		AL SITE AND CONVEYANCE	
	4.3.1	Construction	
	4.3.2	Operation	
		ALL ZONES	
	4.4.1	Construction	153

		4.4.2	Operation	154
5	SIC	NIFICA	ANT UNAVOIDABLE ADVERSE IMPACTS	155
			9 Site (Preferred Alternative)	
		5.1.1	Route 9 Treatment Plant	
		5.1.2 5.1.3	Route 9 Conveyance System—195th Street Corridor	
	5.2		L SITE	
		5.2.1	Unocal Treatment Plant	
	5.3	5.2.2 Outfal	Unocal Conveyance SystemL ZONES	
RE	FER	RENCES		165
		RES 1. Existi	ng Traffic Conditions	
Fig	ure	2. Trans	it and Non-Motorized Facilities – Route 9 Site	
Fig	ure	3. Portal	Siting Candidates - Portal 11 - Route 9–195th Street System A	lternative
Fig	ure ·	4. Portal	Siting Candidates - Portal 44 - Route 9–195th Street System A	Iternative
Fig	ure	5. Portal	Siting Candidates - Portal 41 - Route 9–195th Street System A	Iternative
Fig	ure	6. Portal	Siting Candidates - Portal 5 - Route 9–195th Street System Alt	ernative
_		7. Portal tive	Siting Candidates - Portal 19 (A.M.) - Route 9–195th Street Sy	stem
_		8. Portal tive	Siting Candidates - Portal 19 (P.M.) - Route 9–195th Street Sys	stem
Fig	ure	9. Portal	Siting Candidates - Portal 45 - Route 9–195th Street System A	lternative
Fig	ure	10. Porta	al Siting Candidates - Portal 7 - Route 9–195th Street System A	lternative
Fig	ure	11. Porta	al Siting Candidates - Portal 27 - Route 9–195th Street System A	Alternative
Fig	ure	12. Porta	al Siting Candidates - Portal 23 - Route 9–195th Street System A	Alternative
Fig	ure	13. Porta	al Siting Candidates - Portal 11 - Route 9–228th Street System A	Alternative
Fig	ure	14. Porta	al Siting Candidates - Portal 44 - Route 9–228th Street System A	Alternative
Fig	ure	15. Porta	al Siting Candidates - Portal 41 - Route 9–228th Street System A	Alternative
Fig	ure	16. Porta	al Siting Candidates - Portal 39 - Route 9–228th Street System A	Alternative
Fig	ure	17. Porta	al Siting Candidates - Portal 33 - Route 9–228th Street System A	Alternative
Fig	ure	18. Porta	al Siting Candidates - Portal 26 - Route 9–228th Street System A	Alternative
_		19. Porta tive	al Siting Candidates - Portal 19 (A.M.) - Route 9–228th Street S	ystem
_		20. Porta tive	al Siting Candidates - Portal 19 (P.M.) - Route 9–228th Street S	ystem

October 2003 ii

- Figure 21. Portal Siting Candidates Portal 37 Route 9–228th Street System Alternative
- Figure 22. Portal Siting Candidates Portal 30 Route 9–228th Street System Alternative
- Figure 23. Portal Siting Candidates Portal 24 Route 9–228th Street System Alternative
- Figure 24. Portal Siting Candidates Portal 22 Route 9–228th Street System Alternative
- Figure 25. Transit and Non-Motorized Facilities Unocal Site
- Figure 26. Portal Siting Candidates Portal 14 Unocal System Alternative
- Figure 27. Portal Siting Candidates Portal 11 Unocal System Alternative
- Figure 28. Portal Siting Candidates Portal 7 Unocal System Alternative
- Figure 29. Portal Siting Candidates Portal 3 Unocal System Alternative
- Figure 30. Portal Siting Candidates Portal 13 Unocal System Alternative
- Figure 31. Portal Siting Candidates Portal 12 Unocal System Alternative
- Figure 32. Portal Siting Candidates Portal 10 Unocal System Alternative
- Figure 33. Portal Siting Candidates Portal 5 Unocal System Alternative
- Figure 34. No Action Alternative 2007 Traffic Conditions
- Figure 35. No Action Alternative 2010 Traffic Conditions
- Figure 36. No Action Alternative 2040 Traffic Conditions
- Figure 37. 2007 Construction Traffic Conditions Route 9–195th Street Corridor
- Figure 38. 2007 Construction Traffic Conditions Route 9–228th Street Corridor
- Figure 39. 2010 Operational Traffic Conditions Route 9 Site
- Figure 40. 2040 Operational Traffic Conditions Route 9 Site 54-mgd Treatment Plant
- Figure 41. 2007 Construction Traffic Conditions Unocal Corridor
- Figure 42. 36-mgd Treatment Plant 2010 Operational Traffic Conditions Unocal Site
- Figure 43. 54-mgd Treatment Plant 2040 Operational Traffic Conditions Unocal Site
- Figure 44. 72-mgd Treatment Plant 2040 Operational Traffic Conditions Unocal Site
- Figure 45. 2040 Operational Traffic Conditions Unocal Site Structural Lid With Edmonds Crossing Multimodal Center

TABLES

- Table 1. Intersection and Roadway Segment Level of Service Definitions
- Table 2. Route 9 Site Vicinity Existing Intersection P.M. Peak-Hour Levels of Service
- Table 3. Route 9 Site Vicinity—Accident Analysis
- Table 4. Route 9–195th Street Corridor Segment Access Routes—Existing Peak-Hour Segment Levels of Service

October 2003 iii

- Table 5. Route 9–195th Street Corridor Existing Intersection P.M. Peak-Hour Levels of Service
- Table 6. Route 9–195th Street Corridor Accident Analysis
- Table 7. Route 9–195th Street Corridor, Portal 11 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 8. Route 9–195th Street Corridor, Portal 44 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 9. Route 9–195th Street Corridor, Portal 41 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 10. Route 9–195th Street Corridor, Portal 5 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 11. Route 9–195th Street Corridor, Portal 19 Existing Intersection A.M. Peak-Hour Levels of Service
- Table 12. Route 9–195th Street Corridor, Portal 19 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 13. Route 9–195th Corridor, Portal 45 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 14. Route 9–195th Street Corridor, Portal 7 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 15. Route 9–195th Street Corridor, Portal 27 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 16. Route 9–195th Street Corridor, Portal 23 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 17. Route 9–228th Street Corridor Segment Access Routes Existing Peak-Hour Segment Levels of Service
- Table 18. Route 9–228th Street Corridor Existing Intersection P.M. Peak-Hour Levels of Service
- Table 19. Route 9–228th Street Corridor Accident Analysis
- Table 20. Route 9–228th Street Corridor, Portal 11 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 21. Route 9–228th Street Corridor, Portal 44 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 22. Route 9 228th Street Corridor, Portal 41 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 23. Route 9–228th Street Corridor, Portal 39 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 24. Route 9–228th Street Corridor, Portal 33 Existing Intersection P.M. Peak-Hour Levels of Service

October 2003 iv

- Table 25. Route 9–228th Street Corridor, Portal 26 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 26. Route 9–228th Street Corridor, Portal 19 Existing Intersection A.M. Peak-Hour Levels of Service
- Table 27. Route 9–228th Street Corridor, Portal 19 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 28. Route 9–228th Street Corridor, Portal 37 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 29. Route 9–228th Street Corridor, Portal 22 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 30. Unocal Site Vicinity Existing Segment P.M. Peak-Hour Levels of Service
- Table 31. Unocal Site Vicinity Existing Intersection P.M. Peak-Hour Levels of Service
- Table 32. Unocal Site Vicinity Accident Analysis
- Table 33. Unocal Corridor Existing Segment P.M. Peak-Hour Levels of Service
- Table 34. Unocal Corridor Existing Intersection P.M. Peak-Hour Levels of Service
- Table 35. Unocal Corridor Accident Analysis
- Table 36. Unocal Corridor, Portal 14 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 37. Unocal Corridor, Portal 11 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 38. Unocal Corridor, Portal 7 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 39. Unocal Corridor, Portal 3 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 40. Unocal Corridor, Portal 13 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 41. Unocal Corridor, Portal 12 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 42. Unocal Corridor, Portal 10 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 43. Unocal Corridor, Portal 5 Existing Intersection P.M. Peak-Hour Levels of Service
- Table 44. Study Segment P.M. Peak-Hour Levels of Service—No Action Alternative
- Table 45. Study Intersection P.M. Peak-Hour Levels of Service and Delay—No Action Alternative
- Table 46. SR-9 Study Intersection P.M. Peak Hour Levels of Service and Delay No-Action Alternative with SR-9 Roadway Improvements

- Table 47. Route 9 Site—Summary of Existing Driveway Traffic
- Table 48. Route 9 Site Treatment Plant—Estimated Project Construction Trips
- Table 49. Route 9 Site—Estimated P.M. Peak-Hour Traffic Conditions for Roadway Segments During Construction and Operation
- Table 50. Route 9 Site and Corridors Estimated Intersection P.M. Peak-Hour Traffic During Construction and Operation
- Table 51. SR-9 Study Intersections P.M. Peak Hour Levels of Service and Delay Concurrent Brightwater and SR-9 Roadway Improvement Construction
- Table 52. Route 9 Site Estimated Intersection P.M. Peak-Hour Traffic with the Costco Warehouse Development
- Table 53. Route 9 Site Estimated Intersection P.M. Peak-Hour Traffic with Cumulative Project Impacts
- Table 54. Route 9 Site Treatment Plant—Estimated Generated Traffic Trips During Operation
- Table 55. Route 9 Site Estimated 2040 P.M. Peak-Hour Traffic Conditions for Roadway Segments During Operation
- Table 56. Route 9 Site Estimated 2040 P.M. Peak-Hour Intersection Levels of Service During Operation
- Table 57. Route 9–195th Street Corridor, Portal 5 Estimated Peak Project Construction Trips
- Table 58. Route 9–195th Street Corridor, Portal 5 Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction
- Table 59. Route 9–195th Street Corridor, Portal 11 Estimated Peak Project Construction Trips
- Table 60. Route 9–195th Street Corridor, Portal 11 Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction
- Table 61. Route 9–195th Street Corridor, Portal 19 Estimated Peak Project Construction Trips
- Table 62. Route 9–195th Street Corridor, Portal 19 Estimated 2007 Intersection A.M. Peak-Hour Traffic During Construction
- Table 63. Route 9–195th Street Corridor, Portal 19 Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction
- Table 64. Route 9–195th Street Corridor, Portal 41 Estimated Peak Project Construction Trips
- Table 65. Route 9–195th Street Corridor, Portal 41 Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction
- Table 66. Route 9–195th Street Corridor, Portal 44 Estimated Peak Project Construction Trips

October 2003 vi

Table 67. Route 9–195th Street Corridor, Portal 44 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 68. Route 9–195th Street Corridor, Portal 7 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 69. Route 9–195th Street Corridor, Portal 23 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 70. Route 9–195th Street Corridor, Portal 27 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 71. Route 9–195th Street Corridor, Portal 45 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 72. Route 9–228th Street Corridor, Portal 11 – Estimated Peak Project Construction Trips

Table 73. Route 9–228th Street Corridor, Portal 11 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 74. Route 9–228th Street Corridor, Portal 44 – Estimated Peak Project Construction Trips

Table 75. Route 9–228th Street Corridor, Portal 44 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 76. Route 9–228th Street Corridor, Portal 41 – Estimated Peak Project Construction Trips

Table 77. Route 9–228th Street Corridor, Portal 41 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 78. Route 9–228th Street Corridor, Portal 39 – Estimated Peak Project Construction Trips

Table 79. Route 9–228th Street Corridor, Portal 39 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 80. Route 9–228th Street Corridor, Portal 33 – Estimated Peak Project Construction Trips

Table 81. Route 9–228th Street Corridor, Portal 33 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 82. Route 9–228th Street Corridor, Portal 26 – Estimated Peak Project Construction Trips

Table 83. Route 9–228th Street Corridor, Portal 26 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 84. Route 9–228th Street Corridor, Portal 19 – Estimated Peak Project Construction Trips

Table 85. Route 9–228th Street Corridor, Portal 19 – Estimated 2007 Intersection A.M. Peak-Hour Traffic During Construction

October 2003 vii

Table 86. Route 9–228th Street Corridor, Portal 19 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 87. Route 9–228th Street Corridor, Portal 37 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 88. Route 9–228th Street Corridor, Portal 22 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 89. Unocal Site – Estimated Project Construction Trips

Table 90. Unocal Site Treatment Plant – Estimated Intersection P.M. Peak Hour Traffic During Construction and Operation

Table 91. Unocal Site and Corridor – Estimated P.M. Peak-Hour Traffic for Roadway Segments During Construction and Operation

Table 92. Unocal Site and Corridor – Estimated Intersection P.M. Peak-Hour Traffic with Concurrent Edmonds Crossing Construction

Table 93. Unocal Site Treatment Plant – Estimated Generated Traffic Trips During Operation

Table 94. Unocal Site – Estimated 2040 Peak-Hour Roadway Segment Levels of Service During Operation

Table 95. Unocal Site – Estimated 2040 P.M. Peak-Hour Intersection Levels of Service During Operation

Table 96. Unocal Corridor, Portal 14 – Estimated Peak Project Construction Trips

Table 97. Unocal Corridor, Portal 14 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 98. Unocal Corridor, Portal 11 – Estimated Peak Project Construction Trips

Table 99. Unocal Corridor, Portal 11 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 100. Unocal Corridor, Portal 7 – Estimated Peak Project Construction Trips

Table 101. Unocal Corridor, Portal 7 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 102. Unocal Corridor, Portal 3 – Estimated Peak Project Construction Trips

Table 103. Unocal Corridor, Portal 3 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 104. Unocal Corridor, Portal 13 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 105. Unocal Corridor, Portal 12 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 106. Unocal Corridor, Portal 10 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

October 2003 viii

Table 107. Unocal Corridor, Portal 5 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

Table 108. Estimated Total Truck and Barge Trips – Zone 6

Table 109. Estimated Total Truck and Barge Trips – Zone 7S

Table 110. Route 9 Site and 195th Street Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Table 111. Route 9 Site and 228th Street Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Table 112. Route 9 Site and 195th Street Corridor – Construction Route Mitigation Measures

Table 113. Route 9 Site and 228th Street Corridor – Construction Route Mitigation Measures

Table 114. Route 9 Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic During 54-mgd Operation

Table 115. Unocal Site and Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

Table 116. Unocal Site and Corridor – Construction Route Mitigation Measures

Table 117. Unocal Site – Intersection Mitigation Measures – 2010 P.M. Peak-Hour Traffic During 36-mgd Operation

Table 118. Unocal Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic During 54-mgd Operation

Table 119. Unocal Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic During 72-mgd (Sub-Alternative A) Operation

Table 120. Unocal Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic During 54-mgd with Structural Lid (Sub-Alternative B) Operation

ATTACHMENTS

Attachment A. Unocal Site Remote Truck Staging Area

Attachment B. Unocal Site Offsite Construction Employee Parking Lots Impact Analyses

October 2003 ix

1 PROJECT DESCRIPTION

King County has prepared a Draft Environmental Impact Statement (Draft EIS) and Final Environmental Impact Statement (Final EIS) on the Brightwater Regional Wastewater Treatment System. The Final EIS is intended to provide decision-makers, regulatory agencies, and the public with information regarding the probable significant adverse impacts of the Brightwater proposal and identify alternatives and reasonable mitigation measures.

King County Executive Ron Sims has identified a preferred alternative, which is outlined in the Final EIS. This preferred alternative is for public information only, and is not intended in any way to prejudge the County's final decision, which will be made following the issuance of the Final EIS with accompanying technical appendices, comments on the Draft EIS and responses from King County, and additional supporting information. After issuance of the Final EIS, the King County Executive will select final locations for a treatment plant, marine outfall, and associated conveyances.

The County Executive authorized the preparation of a set of Technical Reports in support of the Final EIS. These reports represent a substantial volume of additional investigation on the identified Brightwater alternatives, as appropriate, to identify probable significant adverse environmental impacts as required by the State Environmental Policy Act (SEPA). The collection of pertinent information and evaluation of impacts and mitigation measures on the Brightwater proposal is an ongoing process. The Final EIS incorporates this updated information and additional analysis of the probable significant adverse environmental impacts of the Brightwater alternatives, along with identification of reasonable mitigation measures. Additional evaluation will continue as part of meeting federal, state, and local permitting requirements.

Thus, the readers of this Technical Report should take into account the preliminary nature of the data contained herein, as well as the fact that new information relating to Brightwater may become available as the permit process gets under way. It is released at this time as part of King County's commitment to share information with the public as it is being developed.

1.1 Overview

The Brightwater Regional Wastewater Treatment System is being planned to carry out the policy mandate contained in the Regional Wastewater Services Plan. The mandate requires construction of a treatment plant and associated facilities in north King County or south Snohomish County to process the projected wastewater capacity for the region. The purpose of this memorandum is to document traffic conditions, assess the traffic impacts, and provide mitigation recommendations associated with the construction of and operation of the alternative Brightwater system.

Two alternative sites for the wastewater treatment plant are being evaluated. Each site is associated with a network of portals along its conveyance system route with an outfall to Puget Sound. The alternatives are as follows:

October 2003

- Route 9 Site Inland, in unincorporated Snohomish County (just north of the City of Woodinville)
- Unocal Site Near Puget Sound, in Edmonds (just south of the Edmonds Marina)

Three alternative conveyance systems are being evaluated for the above sites:

- Route 9, 195th Street influent and effluent system (preferred)
- Route 9, 228th Street influent and effluent system
- Unocal influent system

1.1.1 Summary

This appendix includes the following transportation analysis and detail that has been added since publication of the Draft EIS to address comments raised by federal and local agencies, Washington State Department of Transportation (WSDOT), Washington State Ferries (WSF), Snohomish County, cities along the project's conveyance routes, and citizens. The majority of the comments fell into eight main categories:

- **Portal Sites.** An analysis of each potential portal site for all conveyance routes is provided.
- Construction Activity. The construction activity, schedule, and resulting construction traffic are analyzed for the peak construction period of 2007 for both treatment plant sites and the portals. (In the Draft EIS, peak construction was analyzed for 2010.)
- Construction Sequence. Construction staging, work schedule, shifts, and project trip
 generation at both plant sites and the portals have been updated to reflect a more
 realistic sequencing process.
- Impacts of State Route 9 (SR-9) Improvements. The traffic impacts analysis along SR-9 has been updated to provide a comparison with and without the proposed SR-9 improvements.
- Parking at the Unocal Site. Recommendations are made for remote parking lots for construction workers at the Unocal site.
- **Potential Conflicts with Ferry Traffic.** Recommendations are made for remote truck holding areas for construction at the Unocal site to minimize conflicts with ferry traffic.
- Concurrency Analysis. A transportation concurrency analysis was conducted in compliance with the Snohomish County Unified Development Code, Section 30.66B, for occupancy of the treatment plant at the Route 9 site. (Refer to Appendix 16-A, Transportation Concurrency: Route 9 Plant Site, for this analysis.)
- Planned Developments. A transportation analysis was performed for impacts related
 to planned developments, including concurrent construction of a Costco Warehouse
 near the Route 9 site and the Edmonds Crossing multimodal terminal facility on the
 Unocal Site.

1.1.2 Study Area

The study area, encompassing all treatment plant and conveyance system alternatives, is identified in Figure 1. The area includes north King and south Snohomish Counties from Puget Sound eastward approximately 12.5 miles. This figure depicts the roadway system that may be affected by the project and illustrates the existing roadway volumes. The figure also identifies critical roadway segments that would provide access to either the Route 9 or Unocal treatment plant site and intersections that would serve as key access points.

1.2 Study Methodology

Data collected to support traffic modeling include the physical characteristics of the existing street system in the project area—functional use, lane geometry, traffic signal timing and phasing—and other key parameters necessary to conduct a traffic operations analysis. Information on the roadway system was provided by WSDOT, WSF, the Burlington Northern-Santa Fe (BNSF) railroad, King County, Snohomish County, and the cities and town through which the conveyance corridor alternatives pass (Edmonds, Woodway, Lake Forest Park, Brier, Kenmore, Mountlake Terrace, Shoreline, Bothell, and Woodinville). Twenty-four-hour weekday traffic counts were obtained for the critical roadway segments, and existing peak-hour intersection vehicle turning movement counts were obtained for the study intersections. Available sources were supplemented by data collected in the field specifically for this project. Existing traffic counts are documented in the separately bound "Supplemental Traffic Information" document and can be reviewed by contacting King County.

Both morning (a.m.) and afternoon (p.m.) peak-hour traffic volumes were reviewed; it was determined that for most of the study area, the p.m. peak-hour volumes (typically between 4:00 p.m. and 6:00 p.m.) represent the worst-case traffic operating conditions. Thus only the p.m. data were fully analyzed; the a.m. data were analyzed only for specific locations where the morning volumes were considerable. Generally, the a.m. peak volumes were 84 percent of the p.m. along SR-522, 90 percent along SR-9, and 73 percent along SR-104.

Existing bus route and schedule information (including stop locations) along the alternative conveyance corridors was obtained from local transit agencies.

Historical accident data for the most recent available 3-year period (1999-2001) were obtained for the roadway segments identified for analysis.

Existing and planned pedestrian and bicycle facilities within an approximate 0.5-mile radius of each treatment plant site were inventoried from local transportation plans.

The Puget Sound Regional Council (PSRC) Transportation Improvement Program (TIP), local 6-year transportation improvement programs, and other planned improvements near the conveyance corridors and treatment plant sites were reviewed and summarized to identify all "committed" improvements assumed to be completed by the year 2010.

The traffic forecasts for this analysis are principally based on the most current outputs of the PSRC EMME/2 transportation model by INRO Consultants, which provides an adequate level of detail for streets and roadway segments within the study area. The

analysis used model output to predict traffic volume growth for automobile trips in the years 2007, 2010, and 2040. These forecasts reflect background growth based on the long-range land use projections for the region.

Maritime traffic information was obtained from a variety of primary sources, including WSF, the U.S. Coast Guard, and the Edmonds Marina.

1.2.1 Traffic Impact Analysis

The assessment of transportation impact focuses on two key factors: (1) roadway segment capacity and (2) intersection congestion and delay. Variables include congestion or changes in capacity; changes in circulation or traffic patterns, including the potential for diversion of traffic into neighborhoods; and the impact of construction traffic.

Traffic operations along the study streets are generally controlled by the intersections along a given route. The methodologies presented in the latest Highway Capacity Manual (HCM 2000) issued by USDOT/FHWA (TRB, 2000) were used for the analysis of intersections.

In response to a specific Snohomish County Planning and Development Services request made as part of the Draft EIS public comment period, a separate concurrency study for occupancy of the treatment plant at the Route 9 site was performed (Appendix 16-A, Transportation Concurrency: Route 9 Plant Site). The concurrency study was conducted according to Section 30.66B of the Snohomish County Unified Development Code. Because the methodology used is different from that used in the HCM, the analysis results may vary for the same roadway segment or intersection analyzed. Snohomish County uses average travel speed along arterial units, computed from the Synchro traffic modeling software, to determine level of service (LOS) for roadways under its jurisdiction. Where applicable (Year 2010 operations for the Route 9 site), a comparative result from the concurrency analyses is presented in this document.

The methods used to analyze critical roadway segments involved identifying changes in roadway capacity during construction, due to such factors as slow-moving heavy vehicles, ferry traffic surges, roadway grades, lane width, potential lane closure requirements, alignment shifts, areas of construction activity adjacent to travel lanes, and other reductions in capacity. The methods also include identification of potential construction access routes and the impact of construction-related traffic on these routes. These impacts are expressed in urban street levels of service based on the methodology described in the HCM. The LOS standards are summarized in section 2.1.2 below.

Traffic operations were analyzed for the following conditions:

- Existing conditions
- "No action" (i.e., the No Action Alternative, a baseline condition for impact analysis)
- Construction
- Ongoing operations and maintenance of the treatment plant and conveyance
- Cumulative conditions.

For both plant sites, the majority of construction operations are scheduled to take place over a 4½-year period from mid-2005 through the end of 2009. Construction of the Brightwater project would follow a bell-shaped curve, with a smaller work force at the

beginning and end of the project and the peak workforce occurring in the middle years of construction. A well-planned work program would typically result in a peak workforce of about 1.5 times the average force. The truck trips peak at different times of construction. Excavation is highest at the beginning of construction and then drops to few or no trips. In contrast, concrete and materials delivery trips are very low at the beginning and increase to a constant amount for the middle portion before dropping to few or no trips. For portal site construction, the trends are similar.

Overlaying all of these trips together produces a trend that shows all construction trips peaking from late 2006 to early 2008. Therefore, Year 2007 was chosen as the peak construction year for construction impacts. The impacts from mid-2005 to late 2006 and from early 2008 to the end of 2009 would be less compared to any portion of 2007. For an expanded discussion, refer to Appendix 3-G, Construction Approach and Schedule: Plant, Conveyance, Outfall.

Future traffic volumes are documented in the separately bound "Supplemental Traffic Information" and can be reviewed at King County. Treatment plant operations were analyzed for two different years: 2010, which was assumed to represent the opening-year operational impacts; and 2040, which was chosen to represent the impacts of the action alternatives at full build-out of the plant.

1.2.2 Construction Truck Traffic Impact Analysis

Truck traffic and haul impacts were assessed using the truck types and construction methods assumed for the conveyance and treatment sites. The estimates were provided by URS, Inc., and are documented in the separately bound "Supplemental Traffic Information;" they can be reviewed at King County. The analysis identifies proposed access to construction sites and roadways used to route truck traffic during construction and operations.

A truck trip was defined for this analysis as a one-way trip inbound or outbound; therefore, a round trip was counted as two trips. The daily construction trips, as provided in Appendix 3-G, are broken down into four categories as shown below:

- **Earthwork Trucks.** These are based on a truck and trailer combination (with five or more axles) with an estimated capacity of 16 cubic yards per truck. It is assumed that some of the excavated materials can be stored onsite and hauled away at a relatively steady rate over the duration of earthwork activities.
- Concrete Trucks. Quantities were calculated for each scheduled concrete activity, and the required concrete was totaled on a monthly basis. Average daily trips are based on the quantities needed to meet scheduled monthly totals. The number of trucks is based on delivery of 9 cubic yards per truck, allowing about a 10 percent factor for overages, which is common in the industry.
- Material Delivery Trucks. Each scheduled construction activity was reviewed, and materials required for that activity were estimated. Truck trips were based on experience with similar construction projects. Although material delivery vehicles would vary widely over the course of the project, a typical delivery is considered as a truck and trailer unit with a 40-foot trailer or flatbed.

Personnel Vehicles. The number of vehicles is based on projected manpower requirements over the course of the project. An average vehicle occupancy of 1.3 persons was assumed, which is consistent with region-wide occupancy rates. The typical vehicle is a four-passenger automobile. Personnel vehicle traffic has specific beginning and ending times based on scheduled work shifts.

A single-unit truck was counted as 2.0 vehicles, and any truck with five or more axles was counted as 4.0 vehicles. These data were combined with background traffic forecasts to find a cumulative intersection operation LOS and worst-case impacts to roadway capacity at the study locations in the p.m. peak hours.

The distribution of construction truck traffic assumes designated truck access routes for the construction sites to the interstate freeway system.

1.2.3 Employee Traffic Impact Analysis

Estimates of both construction employee and operational employee trips were developed to assess short-term and long-term impacts of employee travel. Assumptions about mode share (i.e., the proportion of trips using transit, carpool, vanpool, walking, or bicycle travel) were applied to determine the actual number of employee vehicle trips generated during both construction and ongoing operations. An employee trip was defined as a single employee traveling one way in an inbound or outbound vehicle.

Employee trips were applied to background and construction truck traffic forecasts to determine a cumulative intersection LOS and impacts to roadway capacity during the p.m. peak. The distribution of employee traffic was based on existing traffic patterns at the study roadways and intersections.

1.2.4 Transit Access and Routing

Existing transit service and routing and potential impacts were identified using the assumption that existing routes and levels of service would remain constant during project construction and operation. The analysis evaluated the impact that construction of the conveyance system and the treatment plant could have on service, operation, and reliability. In addition, existing transit zone locations were identified, specific impacts evaluated, and mitigation measures proposed.

1.2.5 Conflicts with Other Projects

Conflicts between the treatment plant sites and conveyance corridors and other planned, programmed, or committed projects, such as Edmonds Crossing, were evaluated. Conflicts were assessed qualitatively in terms of schedule and physical impacts.

1.2.6 Emergency Vehicle Access

Existing emergency vehicle access routes were identified and evaluated for construction impacts near the two treatment plant sites and along conveyance corridors.

1.2.7 Bicycle and Pedestrian Access and Circulation

Existing bicycle and pedestrian access routes were identified, and potential impacts were assessed based on route closure and bicycle and pedestrian diversion. Short- and long-term construction impacts to these services were also evaluated.

1.2.8 Cumulative Impact Analysis

The data used in the traffic model incorporated the effects on traffic of future land use development, as projected by the PSRC, and of specific planned and programmed projects in the area. Hence, they reflect the cumulative impacts of local development and transportation projects. Analysis was also performed to reflect the potential impacts if both the Brightwater Treatment Plant and Edmonds Crossing were built on the Unocal site and if the Grange Hall, along with the community-oriented building, was at the Route 9 site.

1.2.9 Conveyance Analysis

Portal site vicinities along the conveyance routes were identified, as well as the construction traffic routes to the site vicinities. Traffic operations and impacts were quantified along these construction routes. Final portal sites within the designated vicinity have not yet been selected.

2 AFFECTED ENVIRONMENT

This section describes the elements of the local and regional transportation system that could be affected by construction and operation of the Brightwater treatment plant, conveyance system, and outfall. This includes the existing local roadways, state routes, and interstate highways; transit service; key bicycle and pedestrian routes; passenger and freight train service; and (where applicable) marine traffic.

Information on existing conditions was collected from published sources and site visits. Traffic and safety analyses were performed using methodologies consistent with HCM 2000, with references to the Manual on Uniform Traffic Control Devices (MUTCD), the Institute of Traffic Engineers (ITE) Traffic Engineering Handbook, the WSDOT Design Manual, and standards of the American Association of State Highway and Transportation Officials (AASHTO).

2.1 Regulatory Environment

2.1.1 Transportation System Justification and Classifications

Transportation facilities fall under the jurisdiction of a number of public entities. Local governments (cities and counties) plan, build, and regulate traffic on most streets within their boundaries, except those under state control. Local governments also plan for and regulate non-motorized transportation facilities in their jurisdictions, such as bicycle paths. WSDOT is responsible for traffic regulation, access, and easements for state highways (such as SR-9, SR-99, SR-104, and SR-522) and interstate freeways (such as I-5 and I-405).

The Coast Guard regulates marine vessel traffic in Puget Sound; activities within navigable waters require Coast Guard permits to ensure noninterference with other marine activities. The Coast Guard has established maritime traffic lanes for vessels in Puget Sound, beginning approximately 10,000 feet offshore from Point Edwards and 7,500 feet offshore from Point Wells. Recreational vessels use the waters of Puget Sound throughout the project area.

Train traffic is regulated by the Federal Railroad Administration, which dictates acceptable speeds and has established track and signal standards. Railway companies operating on the rail system own railroad rights-of-way (ROWs) and have established procedures for permitting activities by other agencies within these ROWs. In the project area, these companies include Amtrak for passenger service and the BNSF for freight service (http://www.bnsf.com/).

Bus transit service within the project area is provided by Sound Transit, King County Metro Transit (http://transmit.metrokc.gov/), and Community Transit (http://www.commtrans.org/).

Roadways are described by the agencies that regulate them in terms of "functional classifications" (also called "roadway classifications"). These classifications denote categories of roadways that serve different purposes and are designed according to different standards. Each jurisdiction or agency may identify its own set of classifications

to describe the roadways within its jurisdiction. General categories identified by AASHTO include the following:

- Local roads and streets. These carry relatively low volumes of traffic and serve local land uses such as residential areas.
- Collector roads and streets. These collect traffic from local roads and streets and funnel it to arterial roadways; these typically have higher traffic volumes than local roadways.
- Rural and urban arterials. These carry relatively high volumes of traffic and primarily serve regional needs (e.g., providing routes to regional commercial centers and other high-activity destinations).
- **Freeways.** These are limited-access roads: access is gained only through interchanges, and no other driveways or cross streets intersect the highway. Freeways are used for long-distance travel and carry high traffic volumes.

2.1.2 Level of Service Standards

The LOS rating is one of the main measurements used by regulatory jurisdictions to determine the traffic operating condition of a roadway segment or intersection. The LOS is assigned under guidelines used by transportation professionals to indicate the overall degree of delay and congestion associated with specific roadways or intersections. LOS definitions (Table 1) have been established by the National Academy of Sciences Transportation Research Board. Public acceptance of LOS conditions, although it may vary locally, has been found to be generally as follows:

- LOS A, LOS B, LOS C, and LOS D—which cover a range from free-flowing traffic to relatively long delays—are considered acceptable.
- LOS E is considered to be the limit of acceptable delay.
- LOS F, characterized by extreme traffic congestion, is undesirable and warrants consideration of improvements to increase roadway capacity.

Table 1. Intersection and Roadway Segment Level of Service Definitions^b

Level of Service	Average Delay (seconds per vehicle) ^a	Traffic Flow Characteristics	
Signalized	Intersections		
А	<u><</u> 10	Most vehicles arrive during the green phase and do not stop at all.	
В	> 10 - <u><</u> 20	More vehicles stop, causing greater delay.	
С	> 20 - <u><</u> 35	/ehicle stopping is significant, but many still pass through the intersection without stopping.	
D	> 35 - <u><</u> 55	Many vehicles stop, and the influence of congestion becomes more noticeable.	
E	> 55 - <u><</u> 80	Very few vehicles pass through without stopping.	

Table 1. Intersection and Roadway Segment Level of Service Definitions^b

Level of Service	Average Delay (seconds per vehicle) ^a	Traffic Flow Characteristics
F	> 80	Unacceptable to most drivers. Intersection is not necessarily over capacity, even though arrivals exceed capacity of lane groups.
Unsignalize	ed Intersections	
Α	<u><</u> 10	Few or no traffic delays.
В	> 10 - <u><</u> 15	Short traffic delays.
С	> 15 - <u><</u> 25	Average traffic delays.
D	> 25 - <u><</u> 35	Long traffic delays.
E	> 35 - <u><</u> 50	Very long traffic delays.
F	> 50	Queuing on minor approaches and not enough gaps of suitable size to allow safe crossing of major streets. Signalization should be investigated at this point.
Level of Service	% of Free Flow Speed	Traffic Flow Characteristics
Roadway S	Segments	
А	90%-100%	The roadway operates under free-flow conditions. Vehicles are completely unimpeded in their ability to maneuver within the traffic stream. Delay at signalized intersections is minimal.
В	70%-89%	Roadway operation is reasonably unimpeded at average travel speeds. The ability to maneuver within the traffic stream is only slightly restricted, and delay at signalized intersections is not significant.
С	50%-69%	The roadway operates at a stable level; however, the ability to maneuver and change lanes in midblock locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds for the given street class.
D	40%-49%	The roadway borders on a range in which small increases in flow may cause substantial increases in delay and decreases in travel speeds. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors.
E	33%-39%	The roadway is characterized by significant delays. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections, and poor signal timing.
F	<33%	The roadway is characterized by urban street flow at extremely low speeds for the given street class. Intersection congestion is likely at critical signalized locations, with high delays, high volumes, and extensive queuing.

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls ^b LOS definitions and methodologies established by the National Academy of Sciences Transportation Research Board, differences from local jurisdiction assumptions may occur. Source: National Academy of Sciences Transportation Research Board, Special Report 209

Under the Washington State Growth Management Act (GMA) of 1990, as amended, local governments are required to set acceptable levels as defined by the responsible jurisdiction of service limits for all locally owned arterials and transit routes. Inside the

urban growth area, each jurisdiction decides that it will accept a certain level of traffic congestion—as measured by LOS—and adopts this standard as part of the transportation element of its comprehensive plan. When a permit for a project is applied for, the jurisdiction determines whether the impacts of the project would lower the LOS below the adopted LOS standard in affected parts of the transportation system. If it would, the jurisdiction has the authority to either deny the permit or require the developer to commit to, or pay for, transportation improvements or strategies to mitigate the impacts.

According to the GMA, such improvements must be completed "concurrent with the development," which in this case is defined as within six years.

Jurisdictions in the Brightwater project area differ in how they designate an acceptable LOS rating. Most affected jurisdictions (WSDOT and the Cities of Edmonds, Shoreline, Lake Forest Park, and Bothell) have adopted LOS D and above as acceptable. The Cities of Mountlake Terrace and Brier and Town of Woodway have adopted a higher threshold, LOS C, while the City of Kenmore, City of Woodinville, and King and Snohomish Counties accept LOS E in most cases. Snohomish County accepts LOS C as a threshold for rural roads. A more detailed listing of LOS standards and exceptions for each of the jurisdictions is documented in the separately bound "Supplemental Traffic Information" and can be reviewed at King County.

In general, LOS standards are applied only to traffic generated by the operation of a proposed project. Construction traffic impacts are regulated through conditions placed on development permits and through the State Environmental Policy Act (SEPA) process. Such conditions could include the designation of specific haul routes for construction truck traffic, carpooling or busing arrangements for construction workers, and restoration of roads damaged by heavy truck traffic

2.2 Route 9 System (Preferred Alternative)

2.2.1 Route 9 Treatment Plant

The Route 9 plant site is located along SR-9 in an unincorporated part of south Snohomish County. The site is bordered by SR-9 to the west and SR-522 to the east. The central and southern portions of the site are developed for commercial and industrial land uses. The northern portion is outside the Urban Growth Area (UGA), is undeveloped and partially forested, and contains some wetlands. The total site is approximately 114.3 acres, with 77 acres within the UGA. The area north of the UGA would not be used for construction of treatment facilities. Primary vehicle access to the site would occur at the SR-9 and 228th Street SE intersection. Secondary access from an additional driveway, south of 228th Street, would be provided along SR-9. A series of roads would be built on the site to provide internal vehicular access to all major unit treatment processes and related buildings.

Transportation systems in the vicinity include local and regional roadways, a BNSF rail line, and pedestrian and bicycle facilities. The roadways range from residential neighborhood streets to major regional highways. Those roadways evaluated as potentially susceptible to adverse impacts from the Brightwater project are SR-9, SR-522, and 228th Street SE:

- **SR-9** is a two-lane north-south roadway with a posted speed limit of 45 mph, classified by WSDOT as a rural-minor arterial near the treatment plant site. SR-9 is part of the Statewide Freight and Goods Transportation System.
- SR-522 is a four-lane east-west divided highway with a posted speed of 55 mph, classified by WSDOT as an urban principal arterial. It provides a connection between SR-2 in east Snohomish County and I-405 in Bothell. West of I-405, SR-522 transitions to a five-lane, undivided arterial with a posted speed of 45 mph. SR-522 is a part of the Statewide Freight and Goods Transportation System.
- 228th Street SE is a two-lane east-west roadway with sidewalks, a bike lane, and a posted speed limit of 35 mph, classified as a minor arterial by Snohomish County. It provides a connection to and from the City of Bothell and SR-405. West of the Bothell-Everett Highway (SR-527), 228th was recently widened to five lanes, transitioning back to three lanes west of Meridian Avenue. The new principal arterial roadway segment generally has sidewalks and bike lanes along both sides, with protected left turns provided at major signalized intersections. Sidewalks are not provided at the eastern end of the roadway.

Traffic Volumes

Existing traffic volumes were obtained from Snohomish County for SR-9 roadway segments studied. Existing average weekday traffic (AWDT) on SR-9 is approximately 24,000 vehicles per day (both directions combined) between 228th and SR-522. The AWDT for 228th is estimated at 5,500 vehicles west of SR-9 and 19,000 vehicles east of SR-527 (Bothell-Everett Highway). The p.m. peak-hour volume for potentially affected SR-9 segments in the vicinity of the Route 9 site is approximately 2,400 vehicles per hour. Existing traffic volumes are illustrated in Figure 1.

Roadway Level of Service

Potentially affected SR-9 segments, north of SR-522, in the vicinity of the Route 9 site have a current LOS rating of F, which is unacceptable based on the WSDOT operations threshold. The 228th Street segments, between SR-9 and SR-527, generally operate well at LOS B/C levels. However, some sections of 228th, as well as SR-9, regularly experience long traffic queuing delays at unsignalized intersections and at driveways accessing local pockets of residential/business developments. This is due to a lack of median turn storage and acceleration lanes and/or heavy volumes of truck traffic. Improvements along 228th Street are planned by Snohomish County and WSDOT, and 228th Street SE west of SR-9, is classified by Snohomish County as a critical arterial unit in arrears. According to Snohomish County Department of Public Works Rule DPWR 4210(V)(A), an arterial is considered to be in arrears if it currently exceeds or is forecast within 6 years to exceed the adopted LOS standard for rural arterials, which is LOS C.

Intersection Level of Service

Five key intersections in the vicinity of the Route 9 site were analyzed to determine the existing traffic conditions. Table 2 summarizes the results. All five intersections are under the jurisdiction of WSDOT, which has an LOS D threshold for acceptable operations. All

study intersections are currently operating at LOS D or better, with the exception of SR-9 at SR-524, which operates unacceptably at LOS E.

Table 2. Route 9 Site Vicinity — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
SR-9 at 228th Street SE	41	D
Bothell-Everett Hwy (SR-527) at 228th Street SE	50	D
SR-9 at SR-522 Eastbound Ramps	43	D
SR-9 at SR-522 Westbound Ramps (unsignalized)	20	С
SR-9 at SR-524 (Maltby Road)	69	E

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

A review of WSDOT accident data for 1999 through 2001 was conducted for the affected segments of SR-522 and SR-9 in the vicinity of the Route 9 site. Accident rates were measured as accidents per million vehicle miles (MVM). Two separate rates were determined, one for the total accidents on the segments and one for all accidents not occurring at intersections. Intersections that had a high number of accident occurrences were also noted. This analysis allowed identification of safety deficiencies along the roadways and at intersections. Table 3 summarizes the findings. As shown on the table, the statewide average is 2.97 accidents per MVM and this is exceeded on one segment of SR-522.

Approximately one-third of the accidents that occur away from intersections involve vehicles entering or exiting driveways. This high rate of occurrence can possibly be attributed to limited driveway sight distance and high traffic travel speeds. These factors, combined with a high number of access points and heavy volumes on arterials such as SR-522, suggest a greater occurrence of potential vehicle conflicts. All of these factors are common contributors to accidents on arterial streets

Table 3 shows that a significant number of accidents in the site vicinity occur at intersections along the route. The following intersections were identified as major contributors to the total number of accidents in the Route 9 site vicinity:

- SR-522 at 61st Avenue NE
- SR-522 at 68th Avenue NE
- SR-522 at 73rd Avenue NE
- SR-522 at 80th Avenue NE
- SR-9 at 228th Street SE

Table 3. Route 9 Site Vicinity — Accident Analysis

Route/Segment	Total Number of Accidents	Total Accident Rate (accidents/MVM) ^{a,b}	Non- Intersection Number of Accidents	Non-Intersection Accident Rate (accidents/MVM) ^a
SR-522 (Bothell Way NE)				
Woodinville Drive to SR-527	110	2.95	53	1.42
SR-527 to SR-104 (Ballinger Way NE)	671	3.22	422	2.03
SR-9				
236th Street SE to 228th Street SE	77	2.93	49	1.86

^aMVM = million vehicle miles

Source: Based on WSDOT Accident Summary Data, 1999-2001

<u>Parking</u>

Designated on-street parking in the vicinity of the Route 9 site does not exist, other than several sections of shoulder that are wide enough to park a vehicle.

Truck Traffic

Truck traffic along SR-9 in the vicinity of the Route 9 site is between 4 and 7 percent of the total p.m. peak-hour vehicle usage. Truck traffic comprises 10 percent of total daily vehicle usage along SR-522 in the vicinity of the Route 9 site, and between 2 and 4 percent of the p.m. peak-hour traffic along 228th Street SE. Truck traffic data were obtained from the 2002 WSDOT Annual Traffic Report and the traffic counts performed for this study. Data are documented in the separately bound "Supplemental Traffic Information" and can be reviewed at King County.

Transit

Transit service is not provided directly to the Route 9 site. Transit service in the vicinity of the Route 9 site is shown in Figure 2.

Pedestrian and Bicycle Circulation

Pedestrian and bicycle travel in the vicinity of the Route 9 site are currently accommodated along paved and gravel shoulders. There are no designated bicycle routes in the vicinity. Figure 2 shows the existing bike/pedestrian trails in the area, which are more than 2 miles removed from the plant site.

Other Transportation Modes

Major airports near the Route 9 site include Paine Field, approximately 8 miles to the north, which serves the Boeing Company's commercial airplane operations and some general aviation operations. The nearest international airport is Seattle-Tacoma International Airport, located in the City of SeaTac, approximately 30 miles to the south. The BNSF railroad operates a track immediately east of the Route 9 site. This is a lightly

^bStatewide rate is 2.97 accidents per MVM (principal arterials in urban areas)

used branch line connecting to the BNSF main line in the south at Tukwila, and in the north near the City of Snohomish.

2.2.2 Route 9 Conveyance System—195th Street Corridor

Two conveyance corridors are being considered for the Route 9 site. Both include an influent pipeline tunneling underground from Kenmore to the Route 9 site and an effluent pipeline tunneling underground from the Route 9 site to an outfall in Puget Sound near Point Wells (Zone 7S). The influent route is the same for both, but the effluent route differs. One alternative generally follows the 228th Street SE/SW alignment, while the other follows the NE 195th Street alignment for a portion of the way. Thus they are known as the 228th Street corridor and the 195th Street corridor. This section describes the 195th Street corridor; section 2.2.3 describes the other conveyance corridor.

Portals in the conveyance corridors are designated either primary or secondary. Primary portals are those required along the route for construction of the tunnel. Secondary portal sites are not expected to be constructed, but might be needed for ventilation, grouting, or entry access. Requirements for secondary portals would be based on geotechnical information obtained and reviewed during the detailed design. Final portal sites have not yet been selected.

The influent pipeline would be constructed primarily by tunneling. A relatively short segment between the North Creek Pump Station and Portal 41 (near NE 195th Street and 120th Avenue NE) would be constructed by microtunneling. Open-cut or microtunnel construction would be used to link the existing wastewater system to the new influent tunnel at Portals 11 (NE 175th Street and 68th Avenue NE) and 44 (NE 195th Street and 80th Avenue NE). The influent route generally follows SR-522 from Portal 11 to 68th Avenue NE, where it turns north to Portal 44; it then goes east along NE 195th Street through the North Creek Business Park (Portal 41) to SR 522, then north along SR-522 to the Route 9 site.

The effluent conveyance for the 195th Street corridor would parallel the influent conveyance south along SR-522 from the Route 9 site and west along NE 195th to Portal 41 (near the intersection of NE 195th and 120th Avenue NE). The conveyance corridor would then follow NE 195th to 80th Avenue NE. At this point the effluent conveyance would diverge from the influent conveyance and would continue west along NE 195th in public and private rights-of-way until reaching SR-104 (Ballinger Way NE). The conveyance corridor then would turn northwest along SR-104 to NE 205th Street (King County designation)/244th Street SW (Snohomish County designation) at the King/Snohomish County boundary (Portal 5). From here the conveyance corridor would run west along NE 205th Street until reaching Puget Sound at Point Wells (Portal 19), where it would connect to the Zone 7S outfall. The approximate length of the system is 16.2 miles including influent, effluent, and local connections.

Roadway System—195th Street Corridor

The major access routes for construction of the 195th Street corridor would include I-5, SR-522 (Bothell Way NE), SR-104 (Ballinger Way NE, N 205th Street, Edmonds Way), 228th Street SE, and I-405. Another major highway in the vicinity is SR-99. I-5, SR-104,

and SR-99 are part of the state highway system and are assumed to have no weight restrictions within the construction route.

Route segments that would provide access for construction vehicles are described below.

Traffic Volumes

The existing afternoon peak and AWDT volumes for SR-522, SR-104, and 228th Street SE are shown in Figure 1.

Level of Service

Table 4 summarizes existing p.m. peak period LOS for urban street segments along the Route 9–195th Street corridor option. Four segments currently operate at LOS E/F, unacceptable levels as defined by the responsible jurisdiction. These are SR-104 west of I-5, Bothell Way NE east of Ballinger Way NE, and SR-9 north of SR-522, which are under WSDOT jurisdiction; and NE 195th Street east of I-405, which is under the City of Bothell's jurisdiction.

Table 4. Route 9–195th Street Corridor Segment Access Routes — Existing Peak-Hour Segment Levels of Service

Roadway	LOS
SR-104 west of Interstate 5	Е
Ballinger Way NE (SR-104) south of 15th Avenue NE	С
SR-99 south of SR-104	С
SR-99 north of SR-104	С
Bothell Way NE (SR-522) east of Ballinger Way NE (SR-104)	F
Bothell Way NE (SR-522) west of Bothell-Everett Hwy (SR-527)	С
NE 195th Street east of Interstate 405	Е
228th Street SE west of SR-9	С
228th Street SE east of Bothell-Everett Hwy (SR-527)	В
SR-9 north of SR-522	F

Intersection Level of Service

Several intersections along this conveyance corridor were evaluated (Table 5) to determine existing traffic conditions. The existing LOS ratings range from acceptable (D or better) to poor and in need of improvement (F). The intersections of Ballinger Way NE at 15th Avenue NE, SR-522 at SR-527 and SR-9 at SR-524 currently operate at an unacceptable LOS E during afternoon peak traffic. SR-104 at SR-522 operates at an unacceptable LOS F level. The four study intersections operating at unacceptable levels are all along state routes.

Table 5. Route 9–195th Street Corridor — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Aurora Avenue (SR-99) at 244th Street SW	52	D
SR-104 at I-5 Southbound Off-Ramp	29	С
Ballinger Way NE (SR-104) at 15th Avenue NE	59	E
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	190	F
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	Е
SR-9 at 228th Street SE	41	D
SR-9 at SR-522 Eastbound Ramps	43	D
SR-9 at SR-522 Westbound Ramps (unsignalized)	20	С
SR-9 at SR-524 (Maltby Road)	69	E

^aIncludes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data from 1999-2001 were reviewed for the SR-522 and SR-104 segments. Accident rates were determined as described in section 2.2.1. Table 6 summarizes the findings. Approximately one-third of the accidents that occur away from intersections involve vehicles entering or exiting driveways; however, as depicted in Table 6, the majority of the accidents occur at the intersections. The following intersections were identified as major contributors to the total:

- SR-522 (Bothell Way NE) at SR-104 (Ballinger Way NE)
- SR-522 at 61st Avenue NE
- SR-522 at 68th Avenue NE
- SR-522 at 73rd Avenue NE
- SR-522 at 80th Avenue NE
- SR-104 at 100th Avenue West
- SR-104 at Meridian Avenue North

Table 6. Route 9-195th Street Corridor — Accident Analysis

Route/Segment	Total Number of Accidents	Total Accident Rate (accidents/MVM) ^{a,b}	Non- Intersection Number of Accidents	Non-Intersection Accident Rate (accidents/MVM) ^a
SR-522				
Woodinville Drive to SR-527	110	2.95	53	1.42
SR-527 to SR-104	671	3.22	422	2.03
SR-104				
SR-522 (Ballinger Way NE) to I-5 Interchange	237	3.86	98	1.60
I-5 Interchange to SR-99	139	1.61	62	0.72

Table 6. Route 9–195th Street Corridor — Accident Analysis

Route/Segment	Total Number of Accidents	Total Accident Rate (accidents/MVM) ^{a,b}	Non- Intersection Number of Accidents	Non-Intersection Accident Rate (accidents/MVM) ^a
SR-99 to 100th Avenue W	120	3.24	44	1.19
SR-9				
236th Street SE to 228th Street SE	77	2.93	49	1.86

^aMVM = million vehicle miles

Source: Based on WSDOT Accident Summary Data, 1999-2001

Parking

On-street parking is not allowed along critical roadway segments that would be used for access including SR-522, 68th Avenue NE, NE 195th Street, 120th Avenue NE, North Creek Parkway, SR-104, SR-99, N 185th Street, and NW Richmond Beach Road.

Truck Traffic

Truck traffic along SR-522 within the potentially affected segments makes up approximately ten percent of the daily traffic volume. The surrounding area is primarily industrial, accounting for the relatively high truck percentage.

Transit

Both Sound Transit and King County Metro provide service along SR-522 between Seattle, Kirkland, Redmond, Bellevue, and the Cities of Woodinville, Bothell, Kenmore, Lake Forest Park, and Shoreline. Metro provides day-long local and peak-hour express service, while Sound Transit provides regional express service focused toward peak-hour commuters. King County Metro also provides service along SR-104 between the Cities of Shoreline and Lake Forest Park and the east side of Lake Washington, with stops at transfer points to Seattle and Everett.

Pedestrian and Bicycle Circulation

Sidewalks along Bothell Way NE are intermittent; other areas have paved shoulders for pedestrians to walk. The Burke-Gilman Trail is a regional bicycle facility that parallels Bothell Way NE, then transitions to the Sammamish River Trail toward the east of I-405.

Portal 11 (Primary)

Alternative Portal Sites

This primary portal is proposed to be located in the vicinity of NE 175th Street and 68th Avenue NE in the Kenmore area. A final portal site has not yet been selected. There are three candidate sites for this portal:

• Site A is at the southwest corner of the intersection of Bothell Way NE and 68th Avenue NE. It is bounded on the south by NE 175th Street. The 2.3-acre site

^bStatewide rate is 2.97 accidents per MVM (principal arterials in urban areas)

currently contains a retail store and an office building. This site can be accessed directly via 68th Avenue NE or NE 175th Street.

- Site B is 500 feet west of the intersection of 68th Avenue NE and NE 175th Street. It is situated on the south side of NE 175th Street on a 4.3-acre lot with an existing warehouse facility. This site can be accessed directly from NE 175th Street.
- Site C is at the northwest corner of the intersection of 68th Avenue NE and NE 181st Street. The 4.1-acre site currently contains a grocery store and shopping center. This site can be accessed directly from 68th Avenue NE or NE 181st Street.

The proposed construction route to all of these sites begins on I-405 and continues west on Bothell Way NE. Access for sites A and B continues south on 68th Avenue NE and west on NE 175th Street. Access to site C continues north on 68th Avenue NE and west on NE 181st Street.

SR-522 (Bothell Way NE) within the proposed construction route is an east-west roadway with good pavement and a posted speed limit of 40 mph. This roadway provides two travel lanes in each direction, a two-way left-turn (TWLT) center lane, and one transit-only lane in each direction. It is bordered by sidewalk, curb, and gutter. Metro bus stops are located just east of 68th Avenue NE. The Burke-Gilman Trail parallels SR-522 on the south side of the roadway. Parking is not allowed on either side of SR-522 within the construction route.

68th Avenue NE is a north-south roadway with good pavement and a posted speed limit of 25 mph north of SR-522 and 35 mph south of SR-522. This roadway is two lanes in each direction and provides access to businesses and other local streets. It is bordered by sidewalk, curb, and gutter. Metro bus stops are provided in the project vicinity. On-street parking is not allowed.

NE 175th Street is an east-west roadway with fair pavement and a posted speed limit of 35 mph. This roadway is one lane in each direction and provides access to businesses. It has varying widths of paved shoulders leading to open-cut drainage. On-street parking is allowed.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

SR-522 and 68th Avenue NE. This intersection is signalized. Both the eastbound and westbound approaches of SR-522 have one left-turn lane, two through lanes, and a right-turn-only-except-transit lane. The northbound approach of 68th Avenue NE has one left-turn lane, a shared through/left lane, and a right-turn-only lane. The southbound approach has one shared through/left and one shared through/right lane. This intersection has sidewalk with ramps, curb, and gutter, marked crosswalks, and pedestrian pushbuttons on all approaches.

SR-522 and SR-527 (Bothell-Everett Highway). This intersection is signalized with four approaches that vary from two to three lanes each. The eastbound approach has two left turn pockets and a through lane. The westbound approach has a through and shared through/right lane (no left turns allowed into SR-527). The northbound approach consists of a left-turn lane and a shared left/through/right lane. The southbound approach consists

of a left/through, through-only, and right-turn lane. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks identified with specialty paving and ramps in all directions, as well as audible pedestrian signals. There are also visual aids at the crosswalks that indicate the time remaining for pedestrians to cross.

68th Avenue NE and NE 175th Street. This intersection is signalized. Both the northbound and southbound approaches of 68th Avenue NE have one shared through/left and one shared through/right lane. The eastbound approach of NE 175th Street has one shared through/left lane and a right-turn lane. The westbound approach has one shared left-through/right lane. This intersection has sidewalks with ramps, curb, and gutter, marked crosswalks, and pedestrian pushbuttons on all approaches.

68th Avenue NE and NE 181st Street. This consists of two offset signalized intersections spaced 150 feet apart:

- The northern intersection is a T containing the westbound approach of NE 181st Street. This approach has one shared left-right lane. The northbound approach of 68th has one through lane and one right-turn-only lane. The southbound approach has one through lane and one shared through/left lane. This intersection has sidewalks with ramps, curb, and gutter, and marked crosswalks with pedestrian pushbuttons across the north and east legs only.
- The southern intersection has four approaches, which contain the eastbound approach of NE 181st Street and a driveway to and from Rite-Aid, serving as the westbound approach. Both the eastbound and westbound approaches have one left-turn lane and one shared through/right lane. The northbound and southbound approaches have one shared through/left lane and one shared through/right lane. This intersection has sidewalks with ramps, curb, and gutter, marked crosswalks, and pedestrian pushbuttons on all approaches.

Figure 3 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections within the immediate vicinity of the portal sites. The intersection of Bothell Way NE and Bothell-Everett Highway is not shown because it lies a significant distance away from the proposed portal siting area.

Traffic Volumes

Afternoon peak-hour intersection turning movements were collected in 2002/2003 to evaluate existing traffic conditions in the portal study area. The existing p.m. traffic volumes at the study intersections showed the peak hour starting at approximately 5:00 p.m. and heavy vehicles making up 1 percent or less of the traffic stream.

Level of Service

The City of Kenmore Comprehensive Plan (March 2001) LOS standard threshold for intersections north of the Sammamish River is LOS E. All intersections within this portal study area are north of the Sammamish River. The WSDOT standard for intersections is LOS D for routes under state jurisdiction. The study intersections currently operate at LOS E or better except for the SR-522/68th NE intersection, which operates below the

acceptable threshold at LOS F (see Table 7), and the intersection of SR-522/SR-527, which operates at LOS E. Both are under state jurisdiction.

Table 7. Route 9–195th Street Corridor, Portal 11 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE/68th Avenue NE	103	F
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	Е
68th Avenue NE/NE 175th Street	16	В
68th Avenue NE/NE 181st Street (northern T)	9	Α
68th Avenue NE/NE 181st Street (Rite-Aid Dwy)	13	В

^aIncludes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 44 (Primary)

Alternative Portal Sites

This primary portal is proposed to be located in the vicinity of the intersection of 80th Avenue NE and NE 195th Street in the Kenmore area. A final portal site has not yet been selected. There are three candidate sites:

- Site C is northeast of the intersection of 80th Avenue NE and NE 195th Street, at the end of private driveway on a 3.6-acre lot that is currently vacant. This site can be accessed via separate private driveways that extend eastbound from the intersection of 80th Avenue NE and NE 195th Street.
- Site D is located to the southeast of the intersection 80th Avenue NE and NE 195th Street. This potential portal location is zoned for single family residential use and partially used for farming. This portal location is 8.8 acres in size. This site can be accessed via separate private driveways that extend eastbound from the intersection of 80th Avenue NE and NE 195th Street.
- Site E is located to the west of the intersection of 80th Avenue NE and NE 195th Street. This portal location is zoned for single-family residential use and is 2.3 acres. This site can be accessed directly from NE 195th Street.

The proposed construction route to all three of these sites begins on I-405 and continues west on SR-522 and then north on 80th Avenue NE to NE 195th Street.

SR-522 between I-405 and the portal is an undivided state highway classified as a principal arterial by WSDOT. The roadway generally extends northeast-southwest and varies between four and five lanes with paved shoulders that range from 5 feet to less than 1 foot wide. There are transit stops at most major intersections. SR-522 has slightly different characteristics north and south of 96th Avenue NE. The northern section has a posted speed limit of 35 mph with two lanes in each direction and a two-way left-turn lane in the center of the roadway. This section has many retail establishments and driveways along the road, which is bordered by sidewalk, curb, and gutter. The southern section has a posted speed limit of 45 mph with two lanes in each direction, which widen

to include a transit-only lane in both directions south and west of 73rd Avenue NE. This section does not have many driveways or businesses. There are no sidewalks and very narrow shoulders. Parking is not allowed on either section of SR-522.

80th Avenue NE is a two-lane, north-south roadway classified as a minor arterial by the City of Kenmore. This road is bordered by a grassy open cut on both sides beyond the 6-foot paved shoulders. There are no sidewalks, curbs, gutters, or marked crosswalks. It is a fairly rural road with few driveways. The speed limit is 40 mph.

NE 195th Street to the west of the intersection is very similar to 80th Avenue NE. It is a two-lane, east-west rural roadway bordered by paved shoulders and an open cut beyond. There are no pedestrian amenities and very few driveways. The speed limit is 25 mph.

NE 195th Street east of 80th Avenue NE extends into two separate private driveways. The driveway that would be part of the construction route is paved, approximately 10 feet wide, and can only accommodate traffic in one direction at a time. There are no shoulders, sidewalks, curbs, gutters, or crosswalks. As the driveway begins to run north, the pavement ends and the road becomes a gravel path.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- **SR-522 and SR-527 (Signalized)**. This intersection is described above under Portal 11 (Primary).
- SR-522 and 80th Avenue NE. This intersection is signalized with three approaches that form a T. The westbound approach on SR-522 has two lanes (through and shared through/right) with 3- to 4-foot paved shoulders. There is a raised median on this approach immediately at the intersection. The eastbound approach has two through lanes and a left-turn refuge area (marked as a two-way-left-turn center lane) with 6-foot paved shoulders. The minor approach (southbound) from 80th Avenue NE has a single lane. This intersection has sidewalk, curb, and gutter on the north corners but none on the south side. It also has marked crosswalks and ramps along the north and east crossings, which provide access to transit stops.
- **80th Avenue NE and NE 195th Street**. This is an unsignalized, rural intersection with four single-lane approaches. Traffic on NE 195th Street is controlled by stop signs in both directions. There are no sidewalks or any type of pedestrian amenities (such as marked crosswalks) at this intersection.

Figure 4 depicts the region surrounding this portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak-hour intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing afternoon traffic volumes at the study intersections showed the peak hour starting between 4:30 and

5:00 p.m. Heavy vehicles comprise less than 2 percent of the traffic stream. Directional traffic flow is heavier southbound on NE 80th and eastbound on SR-522 in the afternoon.

Level of Service

The City of Kenmore Comprehensive Plan (March 2001) LOS standard threshold for intersections north of the Sammamish River is LOS E. All intersections within this portal study area are north of the Sammamish River. The WSDOT standard for intersections under state jurisdiction is LOS D. All of the study intersections currently operate at LOS E or better (Table 8). The intersection of SR-522/SR-527, which is under state jurisdiction, operates at LOS E.

Table 8. Route 9–195th Street Corridor, Portal 44 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	Е
SR-522/80th Avenue NE	49	D
80th Avenue NE/NE 195th Street	18	С

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 41 (Primary)

The microtunnel pipeline is proposed to be located between the existing North Creek Pump Station and Portal 41. Due to the close proximity of the microtunnel and Portal 41, all construction routing and impacts are assumed to coincide and are summarized in the Portal 41 discussion.

Alternative Portal Sites

The portal is proposed to be located in the vicinity of 120th Avenue NE and NE 195th Street in the Bothell area. A final portal site has not yet been selected. There are six candidate sites for this location.

- Site A is located on the northeast corner of the intersection of NE 195th Street and North Creek Parkway. It is situated on a 6.7-acre lot that is currently vacant. Access to this site is from NE 195th Street.
- Site C is located on the southeast corner of the intersection of NE 195th Street and NE 120th Avenue. This site is currently used for heavy industry and is 5.5 acres. Access is from NE 195th Street.
- Site D is south of the intersection of NE 195th Street and 120th Avenue NE. It is situated on a 4.6-acre lot that is currently occupied by a sports field. Access is from 120th Avenue NE.
- Site J is located on the southeast corner of the intersection of NE 195th Street and North Creek Parkway. It is situated on a 3.7 acre lot that is currently the State Farm Insurance building. Access to this site is from NE 195th Street.

- Site W is located on the southwest corner of the intersection of Beardslee Boulevard and Ross Road. It is situated on a 3.3-acre lot that is currently zoned for single-family residential use and is partially occupied. Site W can be accessed directly via Beardslee Boulevard and Ross Road.
- Site X is on the west side of North Creek Parkway. The 3.1-acre parcel is zoned for industrial use. Access to the site is from North Creek Parkway.

The proposed construction route to any of the portal sites begins on I-405 and continues east on NE 195th Street, then south on 120th Avenue NE (sites C and D) or on North Creek Parkway (sites A, J, and X). The proposed construction route to site W begins on I-405 and continues west on NE 195th Street to Beardslee Boulevard, then west on Ross Road.

NE 195th Street is an east-west principal arterial with good pavement, a designated bike lane, and a posted speed limit of 30 mph. This roadway provides two travel lanes in each direction, along with a two-way left-turn center lane for convenient access to businesses. It is bordered by sidewalk, curb, and gutter, with landscaping buffers on both sides of the roadway, and includes crosswalk ramps at all marked crosswalks. Parking is not allowed on either side of NE 195th Street. A signalized midblock pedestrian crossing is provided between North Creek Parkway and 120th Avenue NE.

120th Avenue NE is a north-south arterial with good pavement, a designated bike lane, and a posted speed limit of 35 mph. This roadway provides two travel lanes in each direction, with a two-way left-turn center lane for convenient access to businesses with medians in between. It is bordered by sidewalk, curb, and gutter, with landscaping buffers on both sides of the roadway, and includes crosswalk ramps at all marked crosswalks. Parking is not allowed on either side of 120th Avenue NE. Bus route 372 serves this roadway segment.

North Creek Parkway is a north-south arterial with good pavement, a designated bike lane, and a posted speed limit of 25 mph. At its north end, this roadway has two travel lanes in each direction, along with a two-way left-turn center lane for convenient access to businesses. Going south, it transitions to one travel lane in each direction and a two-way left-turn center lane. The roadway is bordered by sidewalk, curb, and gutter, with landscaping on both sides. Parking is not allowed on either side of 228th Street SW. A midblock pedestrian crossing is provided between NE 195th Street Creek Parkway and 120th Avenue NE.

Beardslee Boulevard turns into a north-south roadway as it continues directly from NE 195th Street on the west side of the I-405 interchange. It has good pavement, a designated bike lane, and a posted speed limit of 30 mph. This roadway provides two travel lanes in each direction, with the southbound direction narrowing to one lane immediately south of Ross Road. It is divided by a landscaped median or Type C curb and is bordered by sidewalk, curb, and gutter, with the Burke-Gilman Trail on the east side of the roadway. Parking is not allowed on either side of Beardslee. Metro Transit bus stops are located on both sides of the roadway immediately south of the intersection with Ross Road.

With proposed construction traffic along the aforementioned streets, the following intersections are analyzed in this appendix:

- I-405 Southbound Ramps and NE 195th Street. This intersection is signalized with three approaches. The eastbound approach has one through lane and a shared through/right lane, and the westbound approach has one left-turn pocket, a left-turn lane, and a through lane. A bike lane is provided in the east and west directions. The southbound approach leg is the off-ramp from I-405 and splits into two lanes (left-only and a shared left/through/right lane) as it approaches the intersection. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks, pedestrian signals, and ramps on all sides except the east side.
- I-405 Northbound Ramps and NE 195th Street. This intersection is also signalized with three approaches. The eastbound approach has two through lanes and a left-turn lane, and the westbound approach has two through lanes and a right-turn pocket. A bike lane is provided in the east and west directions. The northbound approach leg is the off-ramp from I-405 and splits into two lanes (right-only and a shared left/through/right lane) as it approaches the intersection. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks, pedestrian signals, and ramps on all sides except the east side.
- NE 195th Street and North Creek Parkway. This is a signalized intersection with four approaches. The northbound approach has double lefts and a shared through/right lane southbound has a left-turn pocket, a shared through/right lane and an exclusive right-turn pocket; the eastbound has a left-turn pocket; two through lanes, and a right-turn pocket; and the westbound has a left-turn pocket, one through, and a shared through/right lane. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks and pedestrian ramps and hand signals in all directions. Bike lanes are provided on both NE 195th Street and North Creek Parkway.
- NE 195th Street and 120th Avenue NE. This is a signalized intersection with four approaches. The northbound approach has a left-turn pocket, a through lane, and a shared through/right lane; the southbound has a shared left/through lane and a right-turn lane; the eastbound has a left-turn pocket, one through lane, and a right-turn lane; and the westbound has a left-turn pocket and a shared through/right lane. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks and pedestrian ramps and hand signals in all directions. Bike lanes are provided for all directions.
- **Beardslee Boulevard and Ross Road.** This is an unsignalized T-intersection. The northbound approach has a left-turn lane bordered by Type C curb on both sides, and two through lanes, and is freely moving. The southbound approach has a through lane, a shared through/right lane, and a bicycle lane, and is freely moving. The eastbound stop-controlled approach has one right-turn-only lane. Left turns are blocked by Type C curb extending through the intersection. A southbound U-turn is provided a few hundred feet south of the intersection, but would not accommodate trucks. The intersection does not have marked crosswalks.

Figure 5 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate

vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing p.m. traffic volumes at the study intersections showed the peak hour starting between 4:15 and 5:00 p.m. and heavy vehicles making up 2 percent or less of the traffic stream. Directional traffic flow is heavier westbound on NE 195th during the p.m. peak. For 120th NE in the afternoon, flows are evenly distributed in both directions.

Level of Service

Table 9 summarizes the operations at these intersections. The City of Bothell and WSDOT standard for urban roadway operations, which has been assumed for intersection operations in the vicinity of Portal 41 as well, is LOS D. Both of the I-405 ramp intersections with NE 195th and the Beardslee Boulevard/Ross Road intersection operate at an acceptable level, LOS C. NE 195th at North Creek Parkway also operates at an acceptable level, LOS D. The City of Bothell's NE 195th/120th NE intersection operates below acceptable standards at LOS E.

Table 9. Route 9–195th Street Corridor, Portal 41 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
I-405 NB Ramp/NE 195th Street	31	С
I-405 SB Ramp/NE 195th Street	23	С
NE 195th Street/North Creek Parkway	46	D
NE 195th Street/120th Avenue NE	77	E
Beardslee Boulevard/Ross Road	19	С

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 5 (Primary)

Alternative Portal Sites

This primary portal is proposed to be located in the vicinity of SR-104 (Ballinger Way NE) and 15th Avenue NE in the Mountlake Terrace and Shoreline area. The final portal site has not yet been selected. There are three candidate sites:

- Site X is at the southeast corner of the Ballinger Way NE/15th Avenue NE intersection. It is situated on a 1.0-acre lot that currently contains a service station and a bank. This site can be accessed directly via Ballinger Way NE or 15th Avenue NE.
- Site B is 800 feet south of the same intersection on the west side of Ballinger Way
 NE. It is 3.3 acres and has an existing a service building. The site can be accessed
 directly via Ballinger Way NE.

• Site G is 1,000 feet south of the same intersection on the west side of Ballinger Way NE. The site is 1.8 acres and currently consists of an office building and a service building. The site can be accessed directly via Ballinger Way NE.

The proposed construction route to any of the portal sites begins on I-5 and continues east on SR-104 to the intersection with 15th NE.

SR-104 within the proposed construction route is an east-west roadway with good pavement and a posted speed limit of 40 mph. This roadway provides two travel lanes in each direction, along with a two-way left-turn (TWLT) center lane east of the intersection with 15th Avenue NE. It is bordered by sidewalk, curb, and gutter, with a bus pullout for Metro. Parking is not allowed on either side of SR-104 within the construction route.

15th Avenue NE is a north-south roadway with good pavement and a posted speed limit of 35 mph. This roadway is one lane in each direction and provides access to private residences and other local streets. It is bordered by sidewalk, curb, and gutter, with a bus pullout for Metro. Roadway lanes are wide to allow on-street parking.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- SR-104 and 15th Avenue NE. This intersection is signalized. The northbound approach is 15th Avenue NE and has one left-turn lane, a shared through/left lane, and a channelized right-turn lane controlled by a yield sign. The southbound approach is 244th Street SW and has one shared through/left lane and two channelized right-turn lanes controlled by a signal. The eastbound approach is SR-104 (Ballinger Way NE) and has two left-turn lanes, two through lanes, and a channelized right-turn lane controlled by a yield sign. The westbound approach is Ballinger Way NE and has one left-turn lane, one through lane, and a shared through/right lane. This intersection has sidewalk, curb, and gutter, with marked crosswalks with ramps and pedestrian pushbuttons across the northbound and westbound approaches only.
- **SR-104 and I-5 Southbound Ramps**. This intersection is signalized. The eastbound and westbound approaches have two through lanes and serve only through SR-104 traffic. Turns to I-5 are provided upstream and downstream from the intersection. The southbound approach has two left-turn lanes and a direct free right-turn lane that merges with westbound SR-104 traffic west of the intersection. This intersection has 2- to 8-foot shoulders with no pedestrian accommodations.

Figure 6 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the portal sites.

Traffic Volumes

Afternoon peak intersection turning movements were assembled from available WSDOT traffic data and adjusted to existing 2003 conditions with a 1-percent-per-year growth factor to evaluate the existing traffic conditions in the portal study area. The peak traffic hour begins at approximately 5:15 p.m. During the afternoon peak, the eastbound traffic volumes were consistently higher than the westbound at all of the study intersections. No heavy vehicle percentages were provided with the traffic count data.

Level of Service

The WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. Table 10 shows the intersection operations for the two study intersections. SR-104/15th Avenue NE operates at LOS E, below acceptable levels as defined by WSDOT. SR-104/I-5 Southbound off-ramp operates at acceptable levels, at LOS C, during the afternoon peak.

Table 10. Route 9–195th Street Corridor, Portal 5 — Existing Intersection P.M. Peak-Hour Level of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Ballinger Way NE (SR-104) at 15th Avenue NE	59	Е
SR-104 at I-5 Southbound Off-Ramp	29	С

^aIncludes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 19 (Primary)

Alternative Portal Sites

This portal is proposed to be located in the vicinity of Richmond Beach Drive NW and NW 205th Street in the City of Shoreline, the Town of Woodway, and unincorporated Snohomish County. There are three candidate sites:

- Site A is north of the intersection of Richmond Beach Drive NW and NW 205th Street. It is situated on a 1.9-acre lot that is currently undeveloped. This site can be accessed directly via Richmond Beach Drive NW, classified as a minor arterial by King County.
- Site C is also north of the same intersection. This site is 8.5 acres and is at a
 petroleum refining facility. It can be accessed directly via Richmond Beach Drive
 NW.
- Site E is south of the same intersection on the west side of Richmond Beach Drive NW. This 3.4-acre site is currently used for public utility. It can be accessed directly via Richmond Beach Drive.

The proposed construction route to any of these three sites begins on I-5, then goes to SR-104, west to SR-99, and then south to N 185th Street, continuing west to NW Richmond Beach Road, NW 195th Street, and NW 196th Street to Richmond Beach Drive NW.

Additional screening conducted since the Draft EIS has resulted in the identification of site 19-C as the preferred location for Portal 19 permanent facilities.

SR-99 (also known as Aurora Avenue) is a north-south roadway with fair pavement and a posted speed limit of 45 mph. This roadway provides two travel lanes in each direction, along with a two-way left-turn center lane for convenient access to business. There is no curb, gutter, or sidewalk.

N 185th Street is an east-west arterial with good pavement and a posted speed limit of 35 mph. The roadway has two lanes in each direction and a center turning lane between SR-99 and Fremont Avenue N; then it transitions into two lanes each way west of Fremont. The roadway is bordered by sidewalk, curb, and gutter. The road also has many residential and retail driveways. Parking is not allowed on either side. Bus route 315 serves this roadway.

NW Richmond Beach Road is an east-west arterial with good pavement and a posted speed limit of 30 mph. The roadway has two lanes in each direction bordered by curb, gutter, and sidewalk. Parking is not allowed on either side. Bus route 315 serves this roadway.

NW195th Street is an east-west arterial with good pavement and a posted speed limit of 30 mph. The roadway has two lanes in each direction and is bordered by curb, gutter, and sidewalk. Parking is not allowed on either side. Bus route 315 serves this roadway.

NW 196th Street is an east-west minor residential street with good pavement and a posted speed limit of 25 mph. The roadway has one lane in each direction and narrow shoulders. No curb, gutter, or sidewalk is provided on either side of the street.

Richmond Beach Drive NW is a north-south minor residential street with good pavement and a posted speed limit of 25 mph. The roadway has one lane in each direction and narrow shoulders. No curb, gutter, or sidewalk is provided on either side. This roadway also leads to the entrance of the Chevron Richmond Beach Asphalt Terminal.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- N 185th Street and SR-99. This intersection is signalized with five approaches. The northbound approach has two through lanes and double left-turn lanes, and the southbound approach has two through lanes and a single left-turn lane. The eastbound and westbound approaches have one shared through/right-turn lane and one shared through/left-turn lane. The fifth leg is located at the northwest corner with one receiving lane and a right-turn-only departing lane into westbound N 185th Street. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks, pedestrian signals, and ramps.
- NW Richmond Beach Road and 8th Avenue NW. This intersection is also signalized with five approaches. The northbound approach has one shared through/right-turn lane and a left-turn lane, and the southbound approach has one left-turn lane and a shared through/right lane. The eastbound has one through and a shared through/left-turn lane. The westbound has a exclusive left-turn pocket, a through lane, and a shared through/right-turn lane. The fifth leg is oriented at the southwest corner with one receiving lane and a departing lane. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks, pedestrian signals, and ramps.
- **NW 196th Street and Richmond Beach Drive NW.** This is a three-legged, unsignalized intersection controlled by stop signs on the westbound and northbound

approaches. Each approach has one receiving and one departing lane with narrow shoulders. This intersection has no curbs, gutters, or sidewalks.

Figures 7 and 8 depict the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Both a.m. and p.m. peak-hour operations in the vicinity of Portal 19 were analyzed. Peak intersection turning movements were collected in 2003 to evaluate the existing traffic in the portal study area. The data showed the peak hours starting between 7:30 and 8:00 a.m. and 4:00 and 4:45 p.m., respectively. Heavy vehicles make up 2 percent or less of the traffic stream for both peaks. Directional traffic flow is heavier southbound on Richmond Beach Drive NW and eastbound on NW 196th Street, NW Richmond Beach Road, and N 185th Street in the morning. The direction of heavy traffic flow reverses between morning and afternoon.

Level of Service

The City of Shoreline and WSDOT standard for urban roadway operations, which has been assumed for intersection operations as well, is LOS D. The study intersections currently operate at LOS D or better during both peak periods except for the N 185th/SR-99 intersection (see Tables 11 and 12). This intersection, which is under WSDOT jurisdiction, operates at LOS E in both peak periods.

Table 11. Route 9–195th Street Corridor, Portal 19 — Existing Intersection A.M. Peak-Hour Levels of Service

	Average Delay (seconds per		
Intersection	vehicle) ^a	LOS	
N 185th Street and SR-99	56	Е	
NW Richmond Beach Road and 8th Avenue NW	34	С	
NW 196th Street and Richmond Beach Drive NW	9	Α	

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Table 12. Route 9–195th Street Corridor, Portal 19 — Existing Intersection P.M. Peak-Hour Levels of Service

	Average Delay (seconds per	
Intersection	vehicle) ^a	LOS
N 185th Street and SR-99	78	Е
NW Richmond Beach Road and 8th Avenue NW	35	С
NW 196th Street and Richmond Beach Drive NW	9	Α

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 45 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of NE 195th Street and 55th Avenue NE in the Kenmore/Lake Forest Park area. A final portal site has not yet been selected. There are three candidate sites:

- Site A is located 800 feet north of the intersection of NE 195th Street and 55th Avenue NE on the east side of 55th Avenue NE. It is situated on a 1.9-acre lot that is currently zoned for single-family residential use. This site can be accessed from 55th Avenue NE via a private driveway.
- Site C is 700 feet north of the intersection of NE 195th Street and 55th Avenue NE on the west side of 55th Avenue NE. This potential portal location is currently zoned for single-family residential use and is 3.2 acres. This site can be accessed directly via 55th Avenue NE.
- Site D is 200 feet west of the intersection of 58th Avenue NE and NE 193rd Street along the south side of NE 193rd Street. It is situated on a 3.8-acre lot that is currently zoned for single-family residential use. This site can be accessed directly from NE 193rd Street or NE 190th Street.

The proposed construction route to all three sites begins on I-405 and continues west on Bothell Way NE. Access continues north on 61st Avenue NE and west on NE 190th Street or NE 193rd Street to 55th Avenue NE.

SR-522 (Bothell Way NE) within the proposed construction route is an east-west roadway with good pavement and a posted speed limit of 40 mph. This roadway provides two travel lanes in each direction, a two-way left-turn (TWLT) center lane, and one transit-only lane in each direction. It is bordered by sidewalk, curb, and gutter with a bus stop for Metro, and the Burke-Gilman Trail on the south side of the roadway. Parking is not allowed on either side of SR-522 within the construction route.

61st Avenue NE within the proposed construction route is a north-south roadway with good pavement and a posted speed limit of 35 mph. This roadway provides two travel lanes in each direction, transitioning to two lanes northbound and one lane southbound just south of NE 193rd Street. It is bordered by sidewalk on the east side, with curb and gutter on both sides.

55th Avenue NE is a north-south roadway with fair pavement and a posted speed limit of 30 mph. This roadway provides one travel lane in each direction in a residential area. It has paved shoulders of varying width, open-cut drainage, and no sidewalks.

NE 193rd Street is an east-west roadway with fair pavement and a posted speed limit of 25 mph. This roadway provides one travel lane in each direction in a residential area, has no sidewalks, and has open-cut drainage.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

• SR-522 (Bothell Way NE) and SR-527 (Bothell-Everett Highway) (Signalized). This intersection is described above under Portal 11 (Primary).

- **SR-522 and 80th Avenue NE (Signalized).** This intersection is described above under Portal 44 (Primary).
- SR-522 and 68th Avenue NE (Signalized). This intersection is described above under Portal 11 (Primary).

Figure 9 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak intersection turning movements were collected during 2003 to evaluate the existing traffic conditions in the portal study area. The p.m. peak hour on Bothell Way NE begins at approximately 5:00 p.m. The existing p.m. traffic volumes on SR-522 near 61st Avenue NE are slightly heavier in the westbound direction, and heavy vehicles make up 1 percent or less of the traffic stream.

Level of Service

The WSDOT standard for roadway operations along Bothell Way NE, which has been assumed for intersection operations as well, is LOS D. Table 13 shows the intersection operations. The SR-522/SR-527 and SR-522/68th NE intersections both operate at unacceptable levels as defined by WSDOT during the afternoon peak hour, at LOS E and F respectively. Delays at the 80th NE intersection are slightly lower, resulting in acceptable LOS D conditions.

Table 13. Route 9–195th Corridor, Portal 45 — Existing Intersection P.M. Peak-Hour Level of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E
Bothell Way NE/80th Avenue NE	49	D
Bothell Way NE/68th Avenue NE	103	F

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 7 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of Ballinger Way NE (SR-104) and 25th Avenue NE in the Shoreline/Lake Forest Park area. A final portal site has not yet been selected. There are three candidate sites:

• Site A is north of the intersection of Ballinger Way NE (SR-104) and 25th Avenue NE. It is situated on the east side of 25th Avenue NE on a 9.0-acre lot that currently contains a school. The site can be accessed directly from 25th via Ballinger Way NE.

- Site B is also north of the same intersection. It is on the west side of 25th Avenue NE, on a 2.9-acre lot that is currently zoned for public facilities. The site can be accessed directly from 25th Avenue NE via Ballinger Way NE.
- Site C is immediately north of site B. It is on the west side of 25th, on a 4.5-acre lot that is currently zoned for public use. The site can be accessed directly from 25th via Ballinger Way NE.

The proposed construction route to all of these portals begins on I-5 and continues east on Ballinger Way NE (SR-104) to the intersection with 25th Avenue NE.

Ballinger Way NE (SR-104) within the proposed construction route is an east-west roadway with good pavement and a posted speed limit of 40 mph. This roadway provides one travel lane in each direction, with a 2-foot shoulder and curb and gutter on both sides. It is bordered by sidewalk on the east side. A Metro bus pullout is also situated on the east side of the roadway. Parking is not allowed on either side of SR-104 within the construction route.

25th Avenue NE is a north-south roadway with fair pavement and a posted speed limit of 30 mph. This roadway is one lane in each direction and provides access to private residences, businesses, and other local streets. It is bordered by no shoulders and open-cut drainage on both sides. On-street parking is available.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- **SR-104** and **25th Avenue NE.** This intersection has five approaches and is signalized. The northbound and southbound approaches are 25th Avenue NE and have one left/through/right lane each. The northwest- and southeast-bound approaches are Ballinger Way NE and have one left-turn lane with a shared through/right lane. The westbound approach is NE 195th Street and has one left/through/right lane. This intersection has sidewalk, curb, and gutter and marked crosswalks with ramps and pedestrian pushbuttons.
- **SR-104 and 15th Avenue NE (Signalized).** This intersection is described above under Portal 5 (Primary).
- **SR-104 and I-5 Southbound Ramps (Signalized).** This intersection is described above under Portal 5 (Primary).

Figure 10 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites.

Traffic Volumes

Afternoon peak period intersection turning movements were assembled from available WSDOT traffic data and supplemented with 2003 traffic counts. Traffic volumes at several of the WSDOT data collection locations were adjusted to 2003 conditions using a 1-percent-per-year growth factor to evaluate the existing traffic conditions in the portal study area. The p.m. peak hour begins at approximately 5:15 p.m. and was characterized

by heavier eastbound traffic flow at all of the study intersections. No heavy vehicle percentages were provided with the traffic counts.

Level of Service

The WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. Table 14 shows the intersection operations for the three study intersections. The intersection of SR-104 and 15th Avenue NE operates below acceptable operating standards, at LOS E. The remainder of the study intersections operate at LOS C during the afternoon peak.

Table 14. Route 9–195th Street Corridor, Portal 7 — Existing Intersection P.M. Peak-Hour Level of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Ballinger Way NE/25th Avenue NE	28	С
Ballinger Way NE (SR-104) at 15th Avenue NE	59	E
SR-104 at I-5 Southbound Off-Ramp	29	С

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 27 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of NE 205th Street and 1st Avenue NE in the Mountlake Terrace and Shoreline area. A final portal site has not yet been selected. There are three candidate sites:

- Site A is north of the intersection of NE 205th Street and 5th Avenue NE. It is situated on a 7.2-acre lot that is currently open space. This site can be directly accessed from NE 205th Street
- Site B is on the southeast corner of the intersection of NE 205th Street and 1st Avenue NE. It is situated on a 2.9-acre lot that is currently a mortuary, cemetery, and crematorium. This site can be directly accessed from NE 205th.
- Site C is east of the intersection of 76th Avenue W and 242nd Place SW. It is situated on a 2.6-acre lot that is currently undeveloped. This site can be directly accessed from 242nd Place SW.

The proposed construction route to any of these three portal sites begins on I-5 and continues west on SR-104, then north on the Nile Temple Golf Club driveway (opposite 5th Avenue NE) for Site A, south on 1st Avenue NE for Site B, and north on 76th Avenue W to 242nd Place SW for Site C.

With proposed construction along the aforementioned streets, the following intersection is described in this appendix:

• **SR-104 and I-5 Southbound Ramps (Signalized).** This intersection is described above under Portal 5 (Primary).

Figure 11 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the portal sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were assembled from available WSDOT traffic data and supplemented with 2003 traffic counts. The 1995 counts were adjusted to 2003 conditions using a 1-percent-per-year growth factor to evaluate the existing traffic conditions in the portal study area. The afternoon peak hour begins at approximately 5:15 p.m. and is characterized by heavier eastbound traffic flow at all of the study intersections. No heavy vehicle percentages were provided with the traffic counts.

Level of Service

Table 15 summarizes the operations at this intersection. The WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. The study intersection currently operates acceptably at LOS C.

Table 15. Route 9–195th Street Corridor, Portal 27 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay Intersection (seconds per vehicle) ^a LOS	
SR-104 at I-5 Southbound Off-Ramp	29	С

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 23 (Secondary)

Alternative Portal Sites

This portal, if needed, is proposed to be located in the vicinity of Firdale Avenue and 244th Street SW (NW 205th Street) in the Edmonds area. A final portal site has not yet been selected. There are three candidate sites:

- Site A is north of the intersection of 244th Street SW and Firdale Avenue. It is situated on a 3.1-acre lot that is currently zoned for commercial use. This site can be directly accessed from Firdale Avenue.
- Site D is on the west of the same intersection. It is situated on a 2.2-acre lot that is currently zoned for single-family residential use. This site can be directly accessed from Firdale Avenue.
- Site F is at the southwest corner of NW 205th Street and 5th Avenue NW. The 1.5-acre parcel is zoned single-family residential. This site can be directly accessed from NW 205th Street.

The proposed construction route to all of these portals begins on I-5 and continues west on SR-104, then west on NW 205th Street to its intersection with Firdale Avenue.

With proposed construction along the aforementioned streets, the following intersection is described in this appendix:

• **SR-104 and I-5 Southbound Ramps (Signalized).** This intersection is described above under Portal 5 (Primary).

Figure 12 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

See Portal 27 (Secondary) above.

Level of Service

See Portal 27 (Secondary) above. Table 16 summarizes the operations at this intersection.

Table 16. Route 9–195th Street Corridor, Portal 23 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
SR-104 at I-5 Southbound Off-Ramp	29	С

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Influent Pump Station (IPS) Option

The IPS option, if implemented on the 195th Street corridor, would be located in the vicinity of Portal 41. For affected environment, see the Portal 41 discussion above and Table 9.

2.2.3 Route 9 Conveyance System—228th Street Corridor

The 228th Street alternative has the same Route 9 treatment plant site, influent route, and outfall zone as the 195th Street alternative. The effluent route is different.

The effluent portion of the 228th Street alternative would follow the 228th Street SE/SW right-of-way from the Route 9 site to a point near the intersection of 228th Street SW and 95th Place W. This section of the conveyance would include three primary portals: Portal 39 (228th Street SE and 31st Avenue SE), Portal 33 (228th Street SW and Locust Way), and Portal 26 (228th Street SW and Lakeview Drive). The conveyance corridor then would turn south and generally would follow 100th Avenue W until intersecting with NW 205th Street. At NW 205th, the conveyance corridor would head west to connect to the Zone 7S outfall at Point Wells, Portal 19 (NW 205th Street and Richmond Beach Drive NW). The conveyance corridor would generally follow public rights-of-way. Final portal sites have not yet been selected. The approximate length of the system is 20.6 miles including influent, effluent, and local connections.

Roadway System—228th Street Corridor

The major access routes for construction of the Route 9 influent and 228th Street SW effluent pipelines would be I-5, 236th Street SW, 228th Street SW, and I-405. Other major highways in the vicinity are SR-104 and SR-99. I-5, SR-104, and SR-99 are part of the state highway system and are assumed to have no weight restrictions within the construction route.

Route segments that would provide access for construction vehicles are described below.

Traffic Volumes

The existing p.m. peak-hour and AWDT volumes for SR-522 (Bothell Way NE), SR-104 (Ballinger Way NE, N 205th Street, 244th Street SW, Edmonds Way), and 228th Street SE are shown in Figure 1.

Level of Service

Existing p.m. peak-hour volume and LOS for urban street segments along the Route 9–228th Street corridor are summarized in Table 17. Four roadway segments operate at unacceptable LOS E/F conditions during the p.m. peak hour; SR-104 west of Interstate 5, Bothell Way NE east of Ballinger Way NE, NE 195th Street east of I-405, and SR-9 north of SR-522. All of the unacceptable study segments are under WSDOT jurisdiction with the exception NE 195th Street, which is under the City of Bothell's jurisdiction.

Table 17. Route 9–228th Street Corridor Segment Access Routes — Existing Peak-Hour Segment Levels of Service

Roadway	LOS
SR-104 west of Interstate 5	Е
Ballinger Way NE (SR-104) south of 15th Avenue NE	С
SR-99 south of SR-104	С
SR-99 north of SR-104	С
Bothell Way NE (SR-522) east of Ballinger Way NE (SR-104)	F
Bothell Way NE (SR-522) west of Bothell-Everett Highway (SR-527)	С
NE 195th Street east of Interstate 405	Е
228th Street SE west of SR-9	С
228th Street SE east of Bothell-Everett Highway (SR-527)	В
SR-9 north of SR-522	F

Intersection Level of Service

Several intersections along the 228th Street corridor access routes were evaluated to determine existing traffic conditions (Table 18). The existing LOSs range from acceptable (D or better) to poor and in need of improvement (F). The intersections of Bothell Way NE at Bothell-Everett Highway, and SR-9 at SR-524 operate at an unacceptable LOS E. Both study intersections operating at unacceptable levels are under WSDOT jurisdiction.

Table 18. Route 9–228th Street Corridor — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E
SR-9 at 228th Street SE	41	D
Bothell-Everett Hwy (SR-527) at 228th Street SE	50	D
SR-9 at SR-522 Eastbound Ramps	43	D
SR-9 at SR-522 Westbound Ramps (unsignalized)	20	С
SR-9 at SR-524 (Maltby Road)	69	E

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data from 1999-2001 were reviewed for the SR-522, SR-104, and SR-9 segments of the 228th Street corridor. Accident rates were determined as described in section 2.1.2. Table 19 summarizes the findings. Approximately one-third of accidents that occur away from intersections involve vehicles entering or exiting driveways; however, the majority of the accidents occur at the intersections along the route, as shown in Table 20. The following intersections were identified as being major contributors to the total:

- SR-522 (Bothell Way NE) at SR-104 (Ballinger Way NE)
- SR-522 at 61st Avenue NE
- SR-522 at 68th Avenue NE
- SR-522 at 73rd Avenue NE
- SR-522 at 80th Avenue NE
- SR-104 at 100th Avenue West
- SR-104 at Meridian Avenue North

Table 19. Route 9–228th Street Corridor — Accident Analysis

Route/Segment	Total Number of Accidents	Total Accident Rate (accidents/MVM) ^{a,b}	Non-Intersection Number of Accidents	Non-Intersection Accident Rate (accidents/MVM) ^a
SR-522				
Woodinville Drive to SR-527	110	2.95	53	1.42
SR-527 to SR-104	671	3.22	422	2.03
SR-104				
SR-522 to I-5 Interchange	237	3.86	98	1.60
I-5 Interchange to SR-99	139	1.61	62	0.72
SR-99 to 100th Avenue W	120	3.24	44	1.19
SR-9				
236th Street SE to 228th St SE	77	2.93	49	1.86

^aMVM = million vehicle miles

Source: Based on WSDOT Accident Summary Data, 1999-2001

^bStatewide rate is 2.97 accidents per MVM (principal arterials in urban areas)

Parking

On-street parking is not allowed along critical roadway segments that would be used for access including: SR-522, 68th Avenue NE, NE 195th Street, 120th Avenue NE, North Creek Parkway, SR-104, SR-99, N 185th Street, and NW Richmond Beach Road.

Truck Traffic

Truck traffic along SR-522 within the potentially affected segments makes up approximately 10 percent of the daily traffic volume. The surrounding area is primarily industrial, accounting for the relatively high truck percentage.

Transit

Both Sound Transit and King County Metro provide service along SR-522 between Seattle, Kirkland, Redmond, Bellevue, and the Cities of Woodinville, Bothell, Kenmore, Lake Forest Park, and Shoreline. Metro provides day-long local and peak-hour express service, while Sound Transit provides regional express service focused toward peak-hour commuters. King County Metro also provides service along SR-104 between the Cities of Shoreline and Lake Forest Park and the east side of Lake Washington, with stops at transfer points to Seattle and Everett.

Pedestrian and Bicycle Circulation

Sidewalks along Bothell Way are intermittent; other areas have paved shoulders for pedestrians to walk. The Burke-Gilman Trail is a regional bicycle facility that parallels Bothell Way NE, then transitions to the Sammamish River Trail toward the east of I-405.

Portal 11 (Primary)

Alternative Portal Sites

Portal 11 is common to both the 195th Street and 228th Street corridors and is described in section 2.2.2 above. See Figure 13 for the alternative portal sites and the region surrounding the portal siting area. Table 20 summarizes operations at the study intersections.

Table 20. Route 9–228th Street Corridor, Portal 11 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE/68th Avenue NE	103	F
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E
68th Avenue NE/NE 175th Street	16	В
68th Avenue NE/NE 181st Street (northern T)	9	Α
68th Avenue NE/NE 181st Street (Rite-Aid Dwy)	13	В

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 44 (Primary)

Portal 44 is common to both the 195th Street and 228th Street corridors and is described in section 2.2.2 above. See Figure 14 for the alternative portal sites and the region surrounding the portal siting area. Table 21 summarizes operations at the study intersections.

Table 21. Route 9–228th Street Corridor, Portal 44 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	Е
80th Avenue NE/Bothell Way NE	49	D
80th Avenue NE/NE 195th Street	18	С

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 41 (Primary)

Portal 41 is common to both the 195th Street and 228th Street corridors and is described in section 2.2.2 above. See Figure 15 for the alternative portal sites and the region surrounding the portal siting area. Table 22 summarizes operations at the study intersections.

Table 22. Route 9–228th Street Corridor, Portal 41 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
I-405 NB Ramp/NE 195th Street	31	С
I-405 SB Ramp/NE 195th Street	23	С
NE 195th Street/North Creek Parkway	46	D
NE 195th Street/120th Avenue NE	77	Е
Beardslee Boulevard/Ross Road	19	С

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 39 (Primary)

Alternative Portal Sites

This portal is proposed to be located in the vicinity of 228th Street SW and 31st Avenue SE in the Bothell area. A final portal site has not yet been selected. There are three candidate sites:

- Site B is located west of the intersection of 228th Street SW and 31st Avenue SE. It is situated on a 2.9-acre lot that is currently zoned for single-family residential use. This site can be accessed directly from 228th Street SW.
- Site C is at the southeastern corner of the same intersection. This site is also zoned for single-family residential use and is 2.3 acres. It can be accessed directly from 228th Street SW.

• Site D is within the southwest corner of the same intersection. This site is currently zoned for single-family residential use and is 3.0 acres. It can be accessed directly from 31st Avenue SE.

The proposed construction route to all three sites begins on I-405 and continues south on SR-527 (the Bothell-Everett Highway), then east on 228th Street SW to its intersection with 31st Avenue SE.

SR-527 within the construction route is a north-south roadway with good pavement, a designated bike lane, and a posted speed limit of 45 mph. This roadway provides two travel lanes in each direction, along with a two-way left-turn center lane for access to businesses. It is bordered by sidewalk, curb, and gutter, has landscaping buffers on the west side of the roadway, and includes crosswalk ramps at all marked crosswalks. Parking is not allowed on either side of SR-527 within the construction route. The roadway widens at the intersection of 228th Street SW to provide a southbound double left-turn pocket.

228th Street SW is an east-west roadway with good pavement, a designated bike lane, and a posted speed limit that varies from 30 mph to 35 mph. This roadway provides a connection to and from unincorporated Snohomish County and SR-405. East of SR-527, 228th Street SW narrows from five lanes at the intersection to two or three lanes (one lane in each direction plus a center two-way left-turn lane or planted median). The roadway is bordered by sidewalk, curb, and gutter, and has landscaping on the north side only. The road also has many residential and retail driveways. Parking is not allowed on either side of 228th Street SW.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- I-405 Northbound Ramps and SR-527. This intersection is signalized with three approaches. The northbound and southbound approaches each have two through lanes and a separate right-turn lane. The westbound approach leg is the off-ramp from I-405 and splits into two lanes (right-only and shared through/left) as it approaches the intersection. This intersection has sidewalk, curb, and gutter on all corners but the southwest. It also has marked crosswalks, pedestrian signals, and ramps on the north and east sides.
- I-405 Southbound Ramps and SR-527. This intersection is signalized, with three approaches. The northbound and southbound approaches each have two through lanes and separate right-turn lanes onto the I-405 ramps. The eastbound approach leg is the off-ramp from I-405 and splits into three lanes (double left and right-only) as it approaches the intersection. This intersection has sidewalk, curb, and gutter on the west side of the road and on the east side south of the intersection. It also has marked crosswalks, pedestrian signals, and ramps on the south side of the intersection.
- SR-527 and 228th Street SW. This is a signalized intersection with four approaches that vary between three and five lanes. Right-turn lanes are separated by an island on all but the northbound approach. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks, pedestrian ramps, and hand signals in all directions. The southbound approach has two left-turn lanes onto 228th Street SW.

Figure 16 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002 and then adjusted to 2003 to evaluate the existing traffic conditions along the access route to the portal study area. The afternoon peak hour begins at approximately 5:00 p.m. Heavy vehicles are estimated to make up 2 percent of the traffic stream. Directional traffic flow is slightly heavier westbound on 228th Street SW toward SR-527 in the afternoon.

Level of Service

The City of Bothell and WSDOT standard for urban roadway operations, which has been assumed for intersection operations as well, is LOS D. All study intersections currently operate at LOS D or better (Table 23).

Table 23. Route 9–228th Street Corridor, Portal 39 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
I-405 Northbound Ramp/SR-527	36	D
I-405 Southbound Ramp/SR-527	22	С
Bothell-Everett Hwy (SR-527) at 228th Street SE	50	D

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 33 (Primary)

Alternative Portal Sites

This portal is proposed to be located in the vicinity of 228th Street SW and Locust Way in unincorporated Snohomish County. A final portal site has not yet been selected. There are three candidate sites:

- Site A is located west of the intersection of 228th Street SW and Locust Way. It is situated on a 2.7-acre vacant lot. The site can be directly accessed from 228th Street SW.
- Site C is on the northeastern corner of the same intersection. This site is zoned for single-family residential use and is 3.0 acres. It can be accessed directly from 228th Street SW.
- Site D is at the southwest corner of the same intersection. This site is currently zoned for single-family residential use and is 3.0 acres. It can be accessed directly from 228th Street SW.

The proposed construction route to all three sites begins on I-405 and continues south on SR-527 (Bothell-Everett Highway), then west on 228th Street SW to its intersection with Locust Way.

SR-527 within the construction route is a north-south roadway with good pavement, a designated bike lane, and a posted speed limit of 45 mph. This roadway provides two travel lanes in each direction, along with a two-way left-turn center lane for convenient access to businesses. It is bordered by sidewalk, curb, and gutter, with landscaping buffers on the west side of the roadway, and includes crosswalk ramps at all marked crosswalks. Parking is not allowed on either side of SR-527 within the construction route. The roadway widens at the intersection of 228th Street SW to provide a southbound double left-turn pocket.

228th Street SW is an east-west roadway with good pavement, a designated bike lane, and a posted speed limit that varies from 30 mph to 35 mph. This roadway provides a connection to and from unincorporated Snohomish County and SR-405. West of SR-527, 228th Street SW was recently widened to five lanes (two in each direction with a two-way left-turn center lane), transitioning back to three lanes west of Meridian Avenue N. The roadway is bordered by curb and gutter on both sides, but only includes sidewalks (full length between SR-527 and Locust Way) and crosswalk ramps on the northern side. The southern side of the road includes sidewalk and crosswalk curb ramps at signalized intersections only. The road also has many residential and retail driveways. Parking is not allowed on either side of 228th Street SW.

Locust Way is a two-lane, undivided north-south roadway with estimated 1- to 2-foot paved shoulders. There are no sidewalks or curb and gutter, but the roadway is bordered by much landscaping. Access is unrestricted as there are many driveways in this residential area. There is no on-street parking. The posted speed limit is 35 mph.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- I-405 Northbound Ramps and SR-527 (Signalized). This intersection is described above under Portal 39 (Primary).
- I-405 Southbound Ramps and SR-527 (Signalized). This intersection is described above under Portal 39 (Primary).
- SR-527 and 228th Street SW (Signalized). This intersection is described above under Portal 39 (Primary).
- 228th Street SW and 14th Avenue W. This intersection is signalized, with four approaches. Each approach has a left-turn pocket and a shared through/right lane except for the northbound approach, which has 3 separate lanes, one for each movement. This intersection has sidewalk, curb, and gutter, with pedestrian signals and ramps on all four corners. The sidewalk is continuous along the north side of roadway only, while the south side contains landscaping and only provides pedestrian amenities within the intersection.
- 228th Street SW and Locust Way. This is a signalized intersection with three approaches of two lanes each that form a T. This intersection has sidewalk, curb, and gutter on the northeast and southeast corners only, and includes continuous sidewalk on the north side of the westbound approach. It has marked crosswalks, with pedestrian ramps and hand signals on the north and east sides only. Immediately west of the intersection is a steep landscaped slope that is not separated by a handrail or guardrail.

Figure 17 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing afternoon traffic volumes at the study intersections showed the peak hour starting at 5:00 p.m. and heavy vehicles making up less than 1 percent of the traffic stream. Directional traffic flow is slightly heavier westbound on 228th Street SW to Locust Way in the afternoon.

Level of Service

The City of Bothell and WSDOT standard for urban roadway operations, which has been assumed for intersection operations as well, is LOS D. The Snohomish County standard for roadway operations is LOS C (rural roads). All of the study intersections currently operate at acceptable levels (Table 24).

Table 24. Route 9–228th Street Corridor, Portal 33 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
I-405 Northbound Ramp/SR-527	36	D
I-405 Southbound Ramp/SR-527	22	С
Bothell-Everett Hwy (SR-527) at 228th Street SE	50	D
228th Street SW/14th Avenue West	15	В
228th Street SW/Locust Way	12	В

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 26 (Primary)

Alternative Portal Sites

This portal is proposed to be located in the vicinity of 228th Street SW and Lakeview Drive in the Mountlake Terrace/Edmonds area. A final portal site has not yet been selected. There are three candidate sites:

- Site A is located east of the intersection of 228th Street SW and 73rd Avenue West on the south side of Lakeview Drive. The parcel is on land that is designated for public use. The portal location is 3.0 acres in size. The site can be directly accessed from either 228th Street SW or Lakeview Drive.
- Site C is on the southeast corner of 224th Street SW and SR-99. It is currently zoned for commercial use and is 8.9 acres in size. The site can be directly accessed from SR-99 or 224th Street SW.
- Site D is also located east of the intersection of 228th Street SW and 73rd Avenue West, north of Lakeview Drive. It is situated on a parcel that is zoned for single-

family residential use and is 4.4 acres in size. This site can be directly accessed from Lakeview Drive or 74th Avenue W.

The proposed construction route to the portal location area begins on I-5, continues west on SR-104, then runs north on SR-99 to site C. The construction route to sites A and D continues east on 224th Street SW and south on 73rd Avenue W to 228th Street SW (which becomes Lakeview Drive).

I-5, SR-104, and SR-99 are part of the state highway system and are assumed to have no weight restrictions within the construction route.

224th Street SW is an east-west two-lane roadway with good pavement and a posted speed limit of 25 mph. On the south side of the roadway there is sidewalk, curb, and gutter, as well as parallel parking (allowed for the first 200 feet). The north side of the road has no pedestrian amenities. This section of roadway serves industrial/retail land uses. The roadway narrows and the sidewalk ends after approximately 250 feet, where the area becomes residential. This section includes grass shoulders as well as landscaping within the clear zone.

73rd Avenue West is a north-south two-lane residential roadway with good pavement and a posted speed limit of 25 mph. There is no sidewalk, curb, or gutter on either side of the road. The lanes are narrow (approximately 10 feet) and there are obstacles (mailboxes, utility poles, landscaping, etc.) on both sides. There is no designated parking on 73rd Avenue West, but vehicles are parked on grass shoulders. Access is unlimited as there are many driveways for the entire length. South of 226th Street SW, the roadway widens and there are sidewalk, curb, and gutter on both sides of the road. Parking is allowed along the roadway. The weight limit of 73rd Avenue West is posted as 5 tons at the north and south ends of the roadway.

The segment of 228th Street SW within the construction route is an east-west two-lane roadway with many of the same characteristics mentioned above. There is good pavement and a posted speed limit of 25 mph. There are sidewalk, curb, and gutter, as well as parallel parking allowed on both sides of the road west of 73rd Avenue West. To the east, the roadway becomes Lakeview Drive. It includes a two-way left-turn lane in the center and does not include designated streetside parking.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- **SR-99 and 224th Street SW.** This intersection is signalized, with four approaches. There are sidewalk, curb, and gutter, as well as marked crosswalks, ramps, and pedestrian hand signals on all four corners of the intersection. The northbound and southbound approaches each have a left-turn pocket, two through lanes, and a shared right-turn/transit lane. The eastbound and westbound approaches include a shared through/left turn lane and a right-turn lane.
- **224th Street SW and 73rd Avenue W.** This is an unsignalized T-intersection with one lane in each direction. Vehicles traveling north on 73rd Avenue West must stop at the intersection before turning left or right. This intersection does not include sidewalk, curb, gutter, paved shoulders, marked crosswalks, or pedestrian amenities. There are utility poles and other obstructions within 5 feet of the paved roadway.

• 228th Street SW and 73rd Avenue W. This is also an unsignalized T-intersection with one lane in each direction. There are sidewalks along all sides of this intersection, with marked crosswalks and ramps on the east crossing only. The north crossing is marked but does not include ramps. Vehicles traveling south on 73rd Avenue West must stop at the intersection before turning left or right.

Figure 18 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing p.m. traffic volumes at the study intersections showed the peak hour starting at approximately 4:30 p.m. and heavy vehicles making up 1 percent or less of the traffic stream. In the p.m., traffic flow is heavier for the movements that turn away from SR-99 onto residential streets.

Level of Service

The City of Edmonds standard for roadway operations is LOS D, and the Mountlake Terrace standard is LOS C for acceptable operating conditions. The specific standard assumed for intersection operations was based on the jurisdiction of each of the study intersections. All of the study intersections currently operate at an acceptable LOS C or better (Table 25).

Table 25. Route 9–228th Street Corridor, Portal 26 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS	
224th Street SW/SR-99	32	С	
224th Street SW/73rd Avenue West	11	В	
228th Street SW/73rd Avenue West	14	В	

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 19 (Primary)

Portal 19 is common to both the 195th Street and 228th Street corridors and is described in section 2.2.2 above. See Figures 19 and 20 for the alternative portal sites and the region surrounding the portal siting area. Tables 26 and 27 summarize operations at the study intersections.

Table 26. Route 9–228th Street Corridor, Portal 19 — Existing Intersection A.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
N 185th Street and SR-99	56	E
NW Richmond Beach Road and 8th Avenue NW	34	С
NW 196th Street and Richmond Beach Drive NW	9	Α

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Table 27. Route 9–228th Street Corridor, Portal 19 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
N 185th Street and SR-99	78	Е
NW Richmond Beach Road and 8th Avenue NW	35	С
NW 196th Street and Richmond Beach Drive NW	9	Α

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 37 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of 228th Street SW and 9th Avenue SE in Snohomish County. A final portal site has not yet been selected. There are three candidate sites:

- Site A is located southeast of the intersection of 228th Street SW and 9th Avenue SE along 19th Avenue SE. It is situated on a 2.7-acre lot that is zoned for single-family residential and commercial use. Direct access to site A occurs from 19th via 228th.
- Site C is on the northeast corner of the same intersection. This site is partially zoned for single-family residential use and partially vacant. It is 2.7 acres in size. Site C can be directly accessed from 228th or 9th.
- Site D is north of the same intersection. This site is zoned for single-family residential use and is 4.5 acres. It can be accessed directly from 9th.

The proposed construction route begins on I-405 and continues south on SR-527 (the Bothell-Everett Highway), then west on 228th Street SW to Site C, south on 19th Avenue SE to Site A, or north on 9th Avenue SE to Site D.

Figure 21 depicts the region surrounding this portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002 and then adjusted to 2003 to evaluate the existing traffic conditions in the portal study area. The afternoon peak hour begins at approximately 5:00 p.m. The existing p.m. traffic volumes at the study intersections were estimated to have heavy vehicles making up 2 percent of the traffic stream.

Level of Service

The WSDOT and City of Bothell standard for urban roadway operations, which has been assumed for intersection operations as well, is LOS D. The study intersections currently operate at acceptable levels of LOS D or better in the afternoon peak hour (Table 28).

Table 28. Route 9–228th Street Corridor, Portal 37 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
I-405 Northbound Ramp/SR-527	36	D
I-405 Southbound Ramp/SR-527	22	С
Bothell-Everett Hwy (SR-527) at 228th Street SE	50	D

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 30 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of 228th Street SW and 35th Avenue West in Snohomish County. A final portal site has not yet been selected. There are three candidate sites:

- Site A is located southwest of the intersection of 228th Street SW and 35th Avenue
 West. It is set back from 228th Street SW on a 2.5-acre lot that is currently zoned for
 residential use with a portion being vacant. Access to the site follows 228th Street
 SW but continues into a cul-de-sac and via a private driveway.
- Site B is on the southeast corner of the same intersection. This site is partially zoned for single-family residential use and is also partially vacant. It is 2.0 acres in size. Access could occur from either 228th Street SW or 25th Avenue W.
- Site C is located northwest of the same intersection. It is also partially zoned for single-family residential use and is partially vacant. It is 4.9 acres in size. Access could occur from either 228th Street SW or 227th Street SW.

The proposed construction route to all three portals begins on I-5 and continues east on 236th Street SW to Cedar Way. The route would continue north on Cedar Way and then east on 228th Street SW to 35th Avenue West.

236th Street SW is a three-lane (two eastbound, one westbound) east-west roadway in the City of Mountlake Terrace. It has a posted speed limit of 35 mph and is a designated truck route. On-street parking is allowed during limited hours, and transit service is provided.

Cedar Way is a two-lane north-south roadway with a posted speed of 35 mph and is designated as a truck route.

228th Street SW is a two-lane east-west roadway with good pavement and a posted speed limit that varies from 25 mph to 30 mph between 48th Avenue West and the portal location intersection. It is a designated truck route in the City of Mountlake Terrace.

This secondary portal is not along the construction routes for adjacent primary portals or the treatment plant site; thus impacts to the surrounding infrastructure are projected to be minimal. Study intersections were not identified for this location. Should this secondary portal be required, appropriate environmental review will be conducted in support of permits. Figure 22 depicts the alternative portal sites and the region surrounding the portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were not analyzed. Traffic flow is generally heavier in the eastbound direction along 228th Street SW, with a majority of movements onto residential streets.

Portal 24 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of 228th Street SW and 95th Place W in the Edmonds area. A final portal site has not yet been selected. There are three candidate sites:

- Site A is 600 feet west of the intersection of SR-104 (Edmonds Way) and 95th Place
 W along the north side of Edmonds Way. It is situated on a 2.4-acre lot. Site A can be directly accessed from Edmonds Way.
- Site B is 400 feet east of the intersection of 228th Street SW and 95th Place W on the north side of 228th. This site is currently developed as single-family residential and religious activities, and is also partially vacant land. The size is 2.1 acres. This site can be accessed directly via 228th from Edmonds Way and 95th Place W.
- Site C is 400 feet west of the intersection of Edmonds Way and 95th Place W along the south side of Edmonds Way. It is situated on a 2.2-acre lot that is currently in single-family residential use, two-family residential use, and undeveloped vacant land. This site can be accessed directly via Edmonds Way.

The proposed construction route to all three sites begins on I-5 and continues northwest on SR-104 to its intersection with 95th Place W.

This secondary portal is not along the construction routes for adjacent primary portals or the treatment plant site; thus impacts to the surrounding infrastructure are projected to be minimal. Study intersections were not identified for this location. Should this secondary portal be required, appropriate environmental review will be conducted in support of permits.

Figure 23 depicts the alternative portal sites and the region surrounding the portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected during 2003 to evaluate the existing traffic conditions in the portal study area. The existing p.m. traffic volumes at the study intersection showed a peak hour beginning at 4:00 p.m.. The heaviest direction was westbound on Edmonds Way, with heavy vehicles making up less than 1 percent of the traffic. The lighter eastbound traffic also had approximately one percent heavy vehicles.

Portal 22 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of 244th Street SW (NW 205th Street) and 100th Avenue W in the Shoreline and Edmonds areas. A final portal site has not yet been selected. There are five candidate sites:

- Site A is north of the intersection of 244th Street SW and Firdale Avenue. It is situated on a 3.1-acre lot that is currently zoned for commercial use. This site can be directly accessed from Firdale Avenue.
- Site C is in the southwest corner of the intersection of 100th Avenue W and 244th Street SW. It is situated on a 3.3-acre lot that is currently zoned for single-family residential use. Direct access to this site could occur from 8th Avenue NW or NW 205th Street. (NW 205th Street and 244th Street SW are the same street, which divides King and Snohomish Counties. Snohomish County calls it 244th SW, and King County calls it NW 205th.)
- Site D is west of the intersection of 244th Street SW and Firdale Avenue. This site is also zoned for single-family residential use and is 2.2 acres. Direct access would occur from Firdale Avenue.
- Site E is north of the intersection of NW 200th Street and 10th Avenue NW. This site is currently zoned for single-family residential use and is 2.4 acres. Access could occur off of 70th Avenue NW.
- Site F is in the southwest corner of the intersection of NW 205th Street and 5th Avenue NW. The site is zoned for single-family residential use. Direct access could occur from either NW 205th Street or 5th Avenue NW.

The proposed construction route to all five portals begins on I-5 and continues west on SR-104 (Ballinger Way NE), then west on 244th Street SW (NW 205th Street) to the intersection of 100th Avenue W.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

SR-104 and I-5 Southbound Ramps. This intersection is signalized. The eastbound and westbound approaches have two through lanes and serve only through SR-104 traffic. Turns to I-5 are provided upstream and downstream from the intersection. The

southbound approach has two left-turn lanes and a direct free-right-turn lane that merges with westbound SR-104 traffic west of the intersection. This intersection has no pedestrian accommodations and 2- to 8-foot shoulders.

Figure 24 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were assembled from available WSDOT traffic data and supplemented with 2003 traffic counts. The 1995 counts were adjusted to 2003 conditions using a 1-percent-per-year growth factor to evaluate the existing traffic conditions in the portal study area. The afternoon peak hour, which begins at approximately 5:15 p.m., was characterized by heavier eastbound traffic flow at all of the study intersections. No heavy vehicle percentages were provided with the traffic counts.

Level of Service

The WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. Table 29 shows the intersection operations for the study intersection. The intersection operates at LOS C conditions during the afternoon peak.

Table 29. Route 9–228th Street Corridor, Portal 22 — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
SR-104 at I-5 Southbound Off-Ramp	29	С

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Influent Pump Station (IPS) Option

The affected environment for the 228th Street corridor IPS Option is the same as described for Portal 41. See Table 9 and the Portal 41 discussion under Primary Portals in the section titled Conveyance–195th Street Corridor.

2.3 Unocal Site

2.3.1 Unocal Treatment Plant

The Unocal site is located near Puget Sound at the south end of the City of Edmonds waterfront, abutting the Town of Woodway to the south. The site was a petroleum products tank farm and asphalt plant. It is zoned Master Plan Hillside Mixed Use 1 and 2, which provides for uses such as residential, office, restaurant, parks, local public facilities, educational facilities, and a multimodal transportation center. The site is 53 acres and includes a 4.5-acre parcel west of the railroad tracks and a portion of the right-of-way for Pine Street. Under this alternative, Pine Street would be relocated to accommodate the treatment plant. Primary vehicle access to the site is from Edmonds

Way (SR-104) to Pine Street. A series of roads would be built on the plant site to provide internal vehicular access to all major unit treatment processes and related buildings.

Transportation systems in the vicinity of the site include local and regional roadways; the Edmonds ferry dock; marine shipping lanes in Puget Sound; BNSF and Amtrak railways; and pedestrian and bicycle facilities. Edmonds Crossing, a multimodal facility integrating ferry, rail, and bus service, is proposed by WSDOT and the City of Edmonds for development on the Unocal site. That project is under a separate environmental review and has not yet been permitted.

The street and highway system providing access to and from the Unocal site is shown in Figure 1, along with existing daily and afternoon peak-hour traffic volumes. Roadways in the vicinity range from residential neighborhood streets to a major regional highway. Those roadways potentially affected by the Unocal site alternative are Pine Street, Unocal Road, Dayton Street, Edmonds Way, and SR-104 to the interchange of I-5. Each is briefly described in the following paragraphs.

SR-104 extends from SR-522 in Kenmore to the Edmonds Terminal. West of 15th Avenue NE, SR-104 is four to five lanes, including a TWLT lane. SR-104 is a major regional arterial that provides access to the City of Edmonds Central Business District. It connects SR-99, I-5, and SR-522, and is the signed access route from I-5 to the ferry terminal. SR-104 is signed with a number of roadway names and has differing cross sections (widths and lane configurations) between the Edmonds Terminal and Bothell Way NE (SR-522). These are generally described as follows:

- The route is signed as Edmonds Way from the ferry terminal to SR-99 and is primarily a four-lane urban highway with intermittent TWLT lanes and sidewalks.
- Between SR-99 and 15th Avenue NE, the route is signed as both N 205th Street (King County designation) and 244th Street SW (Snohomish County designation) and has the same general cross section as the preceding segment.
- From its intersection with 15th Avenue NE to its eastern terminus at SR-522, the
 route is signed as Ballinger Way NE and provides one lane in each direction with
 intermittent left-turn bays at intersections.

SR-104 is classified as a truck route and is a part of the Statewide Freight and Goods Transportation System. Truck traffic is estimated at 9 percent of total daily traffic.

Pine Street is a two-lane minor arterial running east-west in the City of Edmonds with a posted speed limit of 25 mph. Sidewalks are present along both sides of the street, with occasional gaps on both sides. The roadway serves primarily local traffic, providing access to downtown Edmonds from local areas east of SR-104 and residential areas of Woodway to the west. Ferry traffic access from Pine Street is prohibited during peak ferry usage (afternoon and early evening). According to the Edmonds Fire Department, Pine Street is an emergency access route to the Town of Woodway.

Unocal Road is a private roadway extending from Pine Street into the Unocal site. It has no posted speed limit and serves only as access to and from the Unocal site and the Deer Creek Hatchery.

Dayton Street is a two-lane minor arterial running east-west within the City of Edmonds. It has a posted speed limit of 25 mph and sidewalks on both sides. Dayton Street serves primarily local traffic.

Traffic Volumes

Traffic volume data were obtained from WSDOT, Snohomish County, King County, and the Cities of Edmonds, Bothell, Brier, Kenmore, and Mountlake Terrace. The existing AWDT volumes along SR-104 are estimated to range from approximately 10,000 vehicles just north of Pine Street to 22,000 between SR-99 and Pine Street and nearly 47,000 between I-5 and SR-99. These data were obtained from WSDOT's 2002 Annual Traffic Report. The afternoon peak hour is used in transportation planning to represent worst-case traffic conditions, which generally occur during the afternoon commute (between approximately 4:00 and 6:00 p.m.). Afternoon peak-hour traffic generally comprises approximately 10 percent of the average weekday traffic (AWDT). These traffic volume data are documented in the separately bound "Supplemental Traffic Information" and can be reviewed at King County.

The Edmonds Terminal is located at the intersection of SR-104 at Main Street in the Edmonds downtown and the waterfront area. Approximately 75 percent of the ferry traffic uses SR-104 to access the terminal; the other 25 percent travels through downtown along Third Avenue to get to Pine Street and SR-104. Ferry access via Pine Street is restricted during peak hours by portable barricades that are set up to accommodate long queues of vehicles waiting to board the ferry. Currently, all critical intersections along SR-104 between the ferry terminal and I-5 have adequate capacity for the traffic demand.

Roadway Level of Service

Generally, the roadway network surrounding the Unocal site is characterized by adequate traffic flow, with some areas of delay. Existing afternoon peak-hour LOSs for potentially affected urban street segments within the vicinity of the Unocal site are shown in Table 30. Existing traffic operations are within the range of acceptable LOS along the majority of SR-104 and SR-99, according to the City of Edmonds and WSDOT guidelines. Between I-5 and SR-99, the LOS of SR-104 during the afternoon peak hour is E, which is below the acceptable level as defined by the WSDOT threshold.

Table 30. Unocal Site Vicinity — Existing Segment P.M. Peak-Hour Traffic Levels of Service^a

Roadway Segment	P.M. Peak LOS
Edmonds Way (SR-104) north of Pine Street	В
Edmonds Way (SR-104) north of 100th Avenue W	С
Edmonds Way (SR-104) north of SR-99	В
SR-104 west of Interstate 5	E
Ballinger Way NE (SR-104) south of 15th Avenue NE	С
SR-99 south of SR-104	С
SR-99 north of SR-104	С

^a Based on WSDOT and local cities' traffic counts

Intersection Level of Service

Key intersections in the vicinity of the Unocal site were evaluated to determine existing traffic conditions based on the City of Edmonds and WSDOT guidelines. The existing afternoon peak-hour delay and LOSs for these intersections are summarized in Table 31. All of the key intersections analyzed currently operate at an acceptable LOS D or above with the exception of the Ballinger Way NE at 15th Avenue NE intersection, which operates at LOS E. This intersection is under WSDOT jurisdiction.

Table 31. Unocal Site Vicinity — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Edmonds Way (SR-104) at Dayton Street	15	В
Edmonds Way (SR-104) at Pine Street (unsignalized)	17	С
Edmonds Way (SR-104) at 100th Avenue W	53	D
Aurora Avenue (SR-99) at 244th Street SW	52	D
SR-104 at I-5 Southbound Off-Ramp	29	С
Ballinger Way NE (SR-104) at 15th Avenue NE	59	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data for 1999-2001 were reviewed for the affected segments of SR-104 in the vicinity of the Unocal site. Accident rates were determined along the major arterials as accidents per million vehicle miles (MVM). Table 32 presents a summary of these data. Two separate accident rates were determined: one for the total accidents occurring on the segments (as described in Table 32) and one for all accidents not occurring at intersections. As shown in Table 32, the accident rates along SR-104 roadway segments range from 1.61 to 3.24 accidents per MVM.

Table 32 shows that most of the accidents occur at the intersections. Approximately one-third of the accidents at locations other than intersections involve vehicles entering or exiting driveways. This is attributed to the high number of access points along the roadway (to businesses and to residences), in conjunction with inadequate driveway sight distances along the route. The following locations are identified as high-accident intersections and major contributors to the total number of accidents throughout the SR-104 corridor:

- SR-104 (Edmonds Way) and 100th Avenue West
- SR-104 at Meridian Avenue North (76th Avenue West)

Table 32. Unocal Site Vicinity — Accident Analysis

Route/Segment	Total Number of Accidents	Total Accident Rate (accidents/ MVM) ^{a,b}	Non- Intersection Number of Accidents	Non-Intersection Accident Rate (accidents/MVM) ^a
SR-104 from I-5 Interchange to SR-99	139	1.61	62	0.72
SR-104 from SR-99 to 100th Ave W	120	3.24	44	1.19

^aMVM = million vehicle miles

Source: Based on WSDOT Accident Summary Data, 1999-2001

Parking

On-street parking within the Unocal site vicinity is provided along Pine and Dayton Streets. The City of Edmonds has designated ferry holding lanes along SR-104, where only vehicles waiting for the ferry are allowed to park.

Truck Traffic

Truck traffic along SR-104 in the vicinity of the Unocal site is approximately 2 percent of the total p.m. peak-hour vehicle traffic. Truck traffic along Pine Street makes up 2 percent of p.m. peak hour traffic.

Transit

Transit service is not provided directly to the Unocal treatment plant site. However, Community Transit provides service along SR-104, 5th Avenue South, and Dayton Street, within 0.25 mile walking distance from the site. Transit service, bus stops, and park-and-ride lots are illustrated in Figure 25.

Pedestrian and Bicycle Circulation

Sidewalks are provided along at least one side of the street within most of the Unocal site vicinity. The City of Edmonds is planning to designate Pine Street/216th Street SW and Dayton Street as signed bikeways, providing access between parks within the City of Edmonds and connections to other bicycle routes. The City is also planning to designate SR-104 (Edmonds Way) as a major bike route between 100th Avenue West and 5th Avenue South, providing access to the central business district and ferry terminal. Designated bikeways are signed along Third Avenue South, Pine Street, and Dayton Street, and bicycle parking facilities are available at city parks near the Unocal site (City of Edmonds, 2002).

Other Modes

Major airports near the Unocal site include Paine Field, approximately 8 miles to the north, which serves the Boeing Company's commercial airplane operations and some general aviation operations. The nearest international airport is Seattle-Tacoma International Airport, located in the City of SeaTac, approximately 30 miles to the south. The BNSF railroad operates a track west of the Unocal site. The track currently serves

^bStatewide rate is 2.97 accidents per MVM (principal arterials in urban areas)

both BNSF freight traffic and Amtrak passenger service (six daily trains) and is planned for Sound Transit commuter rail service.

Various modes of commercial and recreational marine transportation operate in Puget Sound in the vicinity of the Unocal site. Marine transportation facilities in the area include established maritime traffic lanes, the Edmonds Marina, ferry traffic routes, and a dock servicing the Chevron Richmond Beach Asphalt Terminal at Point Wells. The Edmonds Marina, home to more than 1,000 boats and the largest charter fishing fleet on Puget Sound, is located immediately north of outfall Zone 6. WSDOT provides regularly scheduled ferry service from the Edmonds Terminal to Kingston, Washington (approximately 25 round trips per day). Tribal fishing by the Suquamish, Tulalip, and Lummi Tribes also takes place in the waters offshore of the site; the boundary between Management Areas 9 and 10 for tribal fishing extends west from the south corner of the Edmonds Marina breakwater. Marine transportation routes for tribal management areas are discussed and shown in Chapter 7. The tribal fishing season comprises a two- to three-week period in November and the first week in April.

2.3.2 Unocal Conveyance System

The conveyance corridor for the Unocal site is a tunnel that would run underground between the existing North Creek Pump Station, located in Bothell near the intersection of I-405 and SR-522, and the Unocal treatment plant site. The influent and effluent lines would run parallel over the whole route. The first segment would run cross-country, outside of existing ROWs, from the North Creek Pump Station to the existing Kenmore Pump Station. From there the tunnel would run under SR-522 and SR-104 to the treatment plant site. The approximate length of the conveyance corridor is 11.6 miles, mostly in King County. Approximately 7.5 of the 11.6 miles is in King County completely, another 1.4 miles runs along the Snohomish/King County border, and 2.7 miles is in Snohomish County completely.

Portals in the conveyance corridors are designated either primary or secondary. Primary portals are those required along the route for construction of the tunnel. Secondary portal sites are not expected to be constructed, but might be needed for ventilation, grouting, or entry access. Requirements for secondary portals would be based on geotechnical information obtained and reviewed during the detailed design. Final portal sites have not yet been selected.

Roadway System—Unocal Corridor

The major access routes for construction of the Unocal corridor would include SR-522 (Bothell Way NE) and SR-104 (Ballinger Way NE, N 205th Street/244th Street SW, Edmonds Way). These routes are described below. Truck traffic would follow these routes to I-5 and I-405. Another major highway in the vicinity is SR-99. I-5, SR-104, and SR-99 are part of the state highway system and are assumed to have no weight restrictions within the construction route.

SR-522 is a four-lane east-west divided highway, described in section 2.2.1.

SR-104 is signed with a number of roadway names and has varying cross sections. It is described in section 2.3.1.

Traffic Volumes

The existing AWDT volume along SR-104 west of SR-99 ranges from 10,000 to 22,000 vehicles per day. Between SR-99 and I-5 the AWDT is approximately 47,000 vehicles per day, including nearly 4,700 during the afternoon peak hour. Farther east, the AWDT along SR-104 decreases to around 21,000 per day. The SR-99 AWDT in the project vicinity is approximately 33,000 vehicles per day.

Level of Service

Existing afternoon peak-hour LOSs for urban street segments along the Unocal corridor are shown in Table 33. Three of the study segments currently operate at unacceptable levels as defined by their respective jurisdictions. The segment of SR-104 just west of I-5 and NE 195th Street east of I-405 currently operate at LOS E. Bothell Way NE east of Ballinger Way NE currently operates at LOS F conditions. SR-104 and Bothell Way NE are under WSDOT jurisdiction, and NE 195th Street, east of I-405, is under the City of Bothell jurisdiction.

Table 33. Unocal Corridor — Existing Segment P.M. Peak Hour Levels of Service

Roadway	Level of Service
Edmonds Way (SR-104), north of Pine Street	В
Edmonds Way (SR-104), north of 100th Avenue W	С
Edmonds Way (SR-104), north of SR-99	В
SR-104, west of Interstate 5	E
Ballinger Way NE (SR-104), south of 15th Avenue NE	С
SR-99, south of SR-104	С
SR-99, north of SR-104	С
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F
Bothell Way NE (SR-522), west of Bothell-Everett Hwy (SR-527)	С
NE 195th Street, east of Interstate 405	E

Intersection Level of Service

Key intersections along the Unocal corridor access routes were evaluated to determine existing traffic conditions. The intersections analyzed are listed in Table 34. The existing delay and LOSs for intersections in the project vicinity range from generally acceptable along SR-104 to unacceptable along SR-522. All intersections are currently operating at LOS D or better during the afternoon peak except for the intersections along Bothell Way NE (SR-522), which operate at LOS E/F, and the Ballinger Way NE (SR-104)/15th Avenue NE intersection, which operates at LOS E. The intersections operating at unacceptable levels are all under WSDOT jurisdiction.

Table 34. Unocal Corridor — Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Edmonds Way (SR-104) at Dayton Street	15	В
Edmonds Way (SR-104) at Pine Street (unsignalized)	17	С
Edmonds Way (SR-104) at 100th Avenue W	53	D
Aurora Avenue (SR-99) at 244th Street SW	52	D
SR-104 at I-5 Southbound Off-Ramp	29	С
Ballinger Way NE (SR-104) at 15th Avenue NE	59	Е
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	190	F
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Accident Experience

WSDOT accident data from 1999 through 2001 were reviewed for the state route segments of the Unocal corridor. These routes primarily include SR-522 and SR-104. Accident rates were determined for the affected segments in terms of accidents per MVM.

Table 35 summarizes the findings of the accident analysis for the Unocal corridor. As shown in Table 35, the majority of accidents occur at the intersections along the route. According to the accident database, approximately one-third of the accidents that occur away from intersections involve vehicles entering or exiting driveways. The following intersections were identified as major contributors to the total number of accidents throughout the conveyance corridor:

- SR-522 (Bothell Way NE) at SR-104 (Ballinger Way NE)
- SR-522 at 61st Avenue NE
- SR-522 at 68th Avenue NE
- SR-522 at 73rd Avenue NE
- SR-522 at 80th Avenue NE
- SR-104 at 100th Avenue West
- SR-104 at Meridian Avenue North

Table 35. Unocal Corridor — Accident Analysis

Route/Segment	Total Number of Accidents	Total Accident Rate (accidents/ MVM) ^{a,b}	Non-Intersection Number of Accidents	Non-Intersection Accident Rate (accidents/MVM) ^a
SR-522 (Bothell Way NE)				_
Woodinville Drive to SR-527	110	2.95	53	1.42
SR-527 to SR-104	671	3.22	422	2.03

Table 35. Unocal Corridor — Accident Analysis

Route/Segment	Total Number of Accidents	Total Accident Rate (accidents/ MVM) ^{a,b}	Non-Intersection Number of Accidents	Non-Intersection Accident Rate (accidents/MVM) ^a
SR-104				
SR-522 to I-5 Interchange	237	3.86	98	1.60
I-5 Interchange to SR-99	139	1.61	62	0.72
SR-99 to 100th Avenue W	120	3.24	44	1.19

a MVM = million vehicle miles

Source: Based on WSDOT Accident Summary Data, 1999-2001

Parking

On-street parking is not allowed along SR-522 or SR-104.

Truck Traffic

WSDOT traffic data indicate that truck traffic along SR-522 within the potentially affected segments is approximately 1 percent of the total p.m. peak vehicle usage. Truck traffic along SR-104 comprises approximately 2 percent of total p.m. peak usage between the Edmonds Terminal and I-5, and less than 2 percent between I-5 and SR-522.

Transit

Both Sound Transit and King County Metro provide service along SR-522 between Kirkland, Redmond, and Bellevue and the Cities of Woodinville, Bothell, Kenmore, Lake Forest Park, Shoreline, and Seattle. Metro provides day-long local and peak-hour express service, while Sound Transit provides regional express service focused toward peak-hour commuters. King County Metro provides service along SR-104 between the Cities of Shoreline and Lake Forest Park and the east side of Lake Washington.

Pedestrian and Bicycle Circulation

Sidewalks along Bothell Way NE are intermittent; however, other areas have paved shoulders for pedestrians to walk. Sidewalks are present along Ballinger Way NE and provide a connection to the Burke-Gilman Trail across Bothell Way NE. The Burke-Gilman Trail becomes the Sammamish River Trail, a regional multi-use pedestrian and bicycle facility that parallels SR-522 between Ballinger Way NE and SR-202. None of the potentially affected roadways have bicycle lanes or are designated bicycle routes.

Portal 14 (Primary)

The microtunnel portal is between the existing North Creek Pump Station and Portal 14. Due to the close proximity of the microtunnel portal and Portal 14, all construction routing and impacts were assumed to coincide and are summarized in the Portal 14 discussion.

Alternative Portal Sites

This portal is proposed to be located in the vicinity of North Creek Parkway and 120th Avenue NE in the Bothell area. A final portal site has not yet been selected. There are

^b Statewide rate is 2.97 accidents per MVM (principal arterials in urban areas)

three candidate sites:

- Site A is on the southwest corner of the intersection of 120th Avenue NE and North Creek Parkway. It is situated on a 4.0-acre lot that is currently vacant and zoned for park use.
- Site B is located on the northwest corner of the same intersection. This site is also currently vacant and zoned for park use and is 3.7 acres.
- Site D is located east of the same intersection. This site is currently used for heavy industry and is 3.2 acres.

All three candidate sites can be accessed directly from North Creek Parkway and 120th Avenue NE. The proposed construction route to all three sites begins on I-405 and continues east on NE 195th Street, then south on North Creek Parkway and/or 120th Avenue NE. The outbound construction traffic route would travel south on North Creek Parkway and/or 120th Avenue NE, east on NE 180th Street, then south on 132nd Avenue NE to SR-522.

NE 195th Street is an east-west principal arterial with good pavement, a designated bike lane, and a posted speed limit of 30 mph. This roadway provides two travel lanes in each direction, along with a TWLT center lane for convenient access to businesses. It is bordered by sidewalk, curb, and gutter, with landscaping buffers on both sides of the roadway, and includes crosswalk ramps at all marked crosswalks. Parking is not allowed on either side of NE 195th Street. A signalized midblock pedestrian crossing is provided between North Creek Parkway and 120th Avenue NE.

North Creek Parkway is a north-south arterial with good pavement, a designated bike lane, and a posted speed limit of 23 mph. This roadway begins in the north end with two travel lanes in each direction, along with a TWLT center lane for convenient access to businesses; it then transitions to one travel lane in each direction with a TWLT center lane. The roadway is bordered by sidewalk, curb, and gutter, with landscaping on both sides. Parking is not allowed on either side of 228th Street SW. A midblock pedestrian crossing is provided between North Creek Parkway and 120th Avenue NE.

120th Avenue NE is a north-south arterial with good pavement, a designated bike lane, and a posted speed limit of 35 mph. This roadway provides two travel lanes in each direction, along with a TWLT center lane for convenient access to businesses with medians in between. It is bordered by sidewalk, curb, and gutter, with landscaping buffers on both sides of the roadway, and includes crosswalk ramps at all marked crosswalks. Parking is not allowed on either side of NE 120th Avenue. Bus route 372 provides service along this roadway segment.

132nd Avenue NE is a north-south arterial that crosses over SR-522. This roadway has a posted speed limit of 35 mph with one travel lane in each direction. It is bordered by sidewalk, curb, and gutter on both sides of the roadway, and includes crosswalk ramps at all marked crosswalks. Parking is not allowed on either side of 132nd Avenue NE.

NE180th Street is an east-west arterial with good pavement and a posted speed limit of 35 mph. This roadway provides two travel lanes in each direction. It is bordered by sidewalk, curb, and gutter on both sides of the roadway, and includes crosswalk ramps at

all marked crosswalks. Parking is not allowed on either side of NE 180th Street. Bus route 372 provides service along this roadway segment.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- I-405 Southbound Ramps and NE 195th Street (Signalized). This intersection is described above under Portal 41 (Primary).
- **NE 195th Street** and **North Creek Parkway (Signalized)**. This intersection is described above under Portal 41 (Primary).
- 120th Avenue NE and North Creek Parkway. This T-intersection is controlled by stop signs. The northbound approach has two through lanes and a left-turn pocket; southbound has one through and a shared through/right lane; and eastbound, controlled by a stop sign, has one left-turn pocket and a right-turn lane. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks and pedestrian ramps in all directions. Bike lane facility is provided in all directions.
- NE 180th Street and 132nd Avenue NE. This T-intersection is controlled by stop signs. The northbound approach has one left-turn lane and a through lane; southbound has one through lane and a right-turn lane; and eastbound, controlled by stop signs, has one left-turn pocket and double right-turn lanes separated by an island. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks and pedestrian ramps on the north and west sides. A bike lane is provided on 132nd along the east side.
- SR-522 Westbound Ramps and 132nd Avenue NE. This intersection is signalized with three approaches. The northbound approach has double lefts and a shared through lane; southbound has one through lane and a right-turn lane; westbound is the off-ramp from SR-522 and splits into two lanes (shared left/through and free-right-turn) as it approaches the intersection. This intersection has sidewalk, curb, and gutter on all corners. It also has marked crosswalks, pedestrian signals, and ramps on the north and west legs.

Figure 26 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing afternoon traffic volumes at the study intersections showed the peak hour starting between 4:15 and 5:00 p.m. and heavy vehicles making up 2 percent or less of the traffic stream. Directional traffic flow is heavier westbound on NE 195th and northbound on 132nd Avenue NE. For 120th Avenue NE and NE 180th Street in the afternoon, flows are evenly distributed in both directions.

Level of Service

Table 36 shows the operations for the study intersections. The City of Bothell and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D (for urban roads). Currently, five of the intersections operate within the acceptable roadway standards. The I-405 ramp intersections with NE 195th Street, NE 195th Street/North Creek Parkway, 120th Avenue NE/North Creek Parkway, and the 132nd Avenue NE/SR-522 WB Ramps operate at LOS D or better. The City of Bothell's 132nd Avenue NE/NE 180th Street intersection operates at LOS F.

Table 36. Unocal Corridor, Portal 14 – Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
I-405 Northbound Ramp/NE 195th Street	31	С
I-405 Southbound Ramp/NE 195th Street	23	С
NE 195th Street/North Creek Parkway	46	D
120th Avenue NE/North Creek Parkway	12	В
NE 180th Street/132nd Avenue NE	70	F
132nd Avenue NE/SR-522 Westbound Ramps	25	С

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 11 (Primary)

Portal 11 is common to the Unocal, Route 9–195th Street, and Route 9–228th Street corridors and is described in section 2.2.2 above. See Figure 27 for the alternative portal sites and the region surrounding the portal siting area. The operations at the study intersections are summarized again in Table 37.

Table 37. Unocal Corridor, Portal 11 – Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE/68th Avenue NE	103	F
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E
68th Avenue NE/NE 175th Street	16	В
68th Avenue NE/NE 181st Street (northern T)	9	Α
68th Avenue NE/NE 181st Street (Rite-Aid Dwy)	13	В

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 7 (Primary)

Portal 7 is a secondary portal to the Unocal and Route 9–195th Street corridors and is described in section 2.2.2 above. See Figure 28 for the alternative portal sites and the region surrounding the portal siting area. The operations at the study intersections are summarized again in Table 38.

Table 38. Unocal Corridor, Portal 7 – Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Ballinger Way NE/25th Avenue NE	28	С
Ballinger Way NE (SR-104) at 15th Avenue NE	59	Е
SR-104 at I-5 Southbound Off-Ramp	29	С

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 3 (Primary)

This portal is proposed to be located in the vicinity of SR-104 (Edmonds Way) and 232nd Street SW in the Edmonds area. A final portal site has not yet been selected. There are three candidate sites:

- Site D is on the northwest corner of the intersection of Edmonds Way (SR-104) and 232nd Street SW. It is situated on a 1.9-acre lot that is currently occupied by singlefamily residential use, medical and other services, and animal husbandry and veterinary services. This site can be accessed directly via Edmonds Way or 232nd Street SW.
- Site E is 200 feet south of the same intersection, on the west side of Edmonds Way. This site is also occupied by single family-residential use, medical and other services, and animal husbandry and veterinary services. Its size is 2.3 acres. This site can be accessed directly via Edmonds Way and 92nd Avenue W.
- Site F is 500 feet south of the intersection of 232nd Street SW and 92nd Avenue W, on the west side of 92nd. It is currently zoned for single-family residential use and is 2.0 acres. The site can be directly accessed from 92nd Avenue W.

All three candidate portal locations can be accessed via Edmonds Way (SR-104), a major arterial from I-5 to the Edmonds Terminal. The proposed construction route to all three portals begins on I-5 and continues northwest on SR-104 to the intersection with 232nd Street SW.

SR-104 within the proposed construction route is a generally southeast-northwest roadway with good pavement and a posted speed limit of 40 mph. This roadway provides two travel lanes in each direction, along with a TWLT center lane for access to businesses. It is bordered by sidewalk, curb and gutter, and a bus pullout for Metro and Community Transit. Parking is not allowed on either side of SR-104 within the construction route.

232nd Street SW is an east-west roadway with fair pavement and a posted speed limit of 25 mph. This roadway is one lane in each direction and provides access to private residences. The roadway is bordered by minimal paved shoulder leading to open-cut drainage. The road also has many residential driveways. Parking is difficult to impossible on both sides of the street due to the negligible shoulders.

92nd Avenue W is a north-south roadway with fair pavement and a posted speed limit of 25 mph. This roadway provides access to private residences from Edmonds Way via its

intersection with 232nd Street SW. The roadway is bordered by minimal paved shoulder leading to open-cut drainage. The road also has many residential driveways. Parking is difficult on both sides of the street due to the negligible shoulders.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- **SR-104 and I-5 Southbound Ramps**. This intersection is signalized. The eastbound and westbound approaches have two through lanes and serve only through SR-104 traffic. Turns to I-5 are provided upstream and downstream from the intersection. The southbound approach has two left-turn lanes and a direct free-right-turn lane that merges with westbound SR-104 traffic west of the intersection. This intersection has 2- to 8-foot shoulders without pedestrian accommodations.
- Edmonds Way and 232nd Street SW. This intersection is controlled by stop signs. The northbound and southbound (Edmonds Way) uncontrolled approaches each have a through lane and a shared through/right lane. Northbound and southbound left-turning vehicles use a TWLT lane. The eastbound and westbound (232nd Street SW) approaches, controlled by stop signs, each have one shared left/through/right lane. This intersection has sidewalk, curb, and gutter, but no marked crosswalks.

Figure 29 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2003 to evaluate the existing traffic conditions in the portal study area. The existing afternoon volumes at Edmonds Way and 232nd Street SW had a peak hour beginning shortly before 5:00 p.m.. The heaviest direction was northbound, with heavy vehicles making up one percent of the traffic. The lighter southbound traffic had heavy vehicles making up two percent.

Level of Service

The Edmonds and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. Table 39 shows the intersection operations for the study intersections. The LOS shown for Edmonds Way/232nd Street SW represents the 232nd Street SW approach with the highest delay because it is a two-way intersection controlled by stop signs. Both study intersections operate at acceptable operating conditions, as defined by the responsible jurisdiction, during the afternoon peak.

Table 39. Unocal Corridor, Portal 3 – Existing Intersection P.M. Peak-Hour Levels of Service

	Average Delay				
Intersection	(seconds per vehicle) ^a	LOS			
SR-104 at I-5 Southbound Off-Ramp	29	С			
Edmonds Way/232nd Street SW ^b	34	D			

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

^b Delay represents the highest delay on the stop controlled legs of the intersection (232nd Street SW)

Portal 13 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of Bothell Way NE and Woodinville Drive in the Bothell area. A final portal site has not yet been selected. There are three candidate sites:

- Site A is located southeast of the intersection of Bothell Way NE and SR-527, along Woodinville Drive, on a 2.0-acre lot that is currently vacant. Access would occur directly off of Woodinville Drive.
- Site B is also located southeast of the same intersection along Woodinville Drive. It is
 on a 3.0-acre lot zoned for professional office use. Access would occur directly off of
 Woodinville Drive.
- Site C is southwest of the same intersection, between Bothell Way NE and NE 180th Street. The site is zoned for commercial use and is 2.7 acres. Access could occur from either Bothell Way NE or NE 180th Street.

The proposed construction route to these portal sites begins on I-405 and continues west on Woodinville Drive to its intersection with Bothell Way NE.

Woodinville Drive and Bothell Way NE between I-405 and the portal constitute a state highway (SR-522) that WSDOT classifies as a principal arterial. Woodinville Drive is an extension of Bothell Way NE, and both have the following features. The roadway generally runs east-west and varies between four and five lanes (two lanes in each direction and a TWLT lane in the center). The lanes are divided for the eastern half of the route. There are transit stops at most major intersections. The posted speed limit is 35 mph. This section has many retail establishments and driveways along the road, which is bordered by sidewalk, curb, and gutter, with paved shoulders ranging from 5 feet to less than 1 foot wide. Parking is not allowed along the roadway.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

• **SR-522 and SR-527 (Signalized).** This intersection is described above in section 2.2.2 under Portal 11 (Primary).

Figure 30 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the portal sites.

Traffic Volumes

Afternoon peak-hour intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The afternoon peak hour begins at approximately 4:15 p.m. The existing afternoon traffic volumes at the study intersections showed heavy vehicles making up two percent or less of the traffic stream. Directional traffic flow is heavier eastbound on Bothell Way NE in the afternoon.

Level of Service

The WSDOT LOS standard threshold for intersections is LOS D. The study intersection currently operates at LOS E (Table 40), which is not within acceptable standards.

Table 40. Unocal Corridor, Portal 13 – Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 12 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of 80th Avenue NE and NE 183rd Street in the Kenmore area. A final portal site has not yet been selected. There are two candidate sites:

- Site C is southwest of the intersection of 80th Avenue NE and NE 183rd Street. It is situated along 80th Avenue NE on a 3.1-acre lot that is currently partially vacant and zoned for single-family residential use. Site C can be accessed directly from 80th Avenue NE.
- Site E is northwest of the same intersection. This site is in single-family residential use and is 2.1 acres. It is accessed via a private driveway off of 80th Avenue NE.

The proposed construction route to either of these portals begins on I-405, continues west on Bothell Way NE, and then runs north on 80th Avenue NE.

Bothell Way NE between I-405 and the portal is as described above for Portal 13. The southern section of Bothell Way NE (south of 96th Avenue NE) has a posted speed limit of 45 mph with two lanes in each direction, which widen out to include a transit-only lane in both directions south and west of 73rd Avenue NE. This section does not have many driveways or businesses. There are no sidewalks and very narrow shoulders. Parking is not allowed on either section of Bothell Way NE.

80th Avenue NE is a two-lane, north-south roadway that is classified as a minor arterial by the City of Kenmore. This road is bordered by a grassy open cut on both sides beyond the 6-foot paved shoulders. There are no sidewalks, curbs, gutters, or marked crosswalks. It is a fairly rural road with few driveways. The speed limit is 40 mph.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- SR-522 (Bothell Way NE) and SR-527 (Bothell-Everett Highway) (Signalized). This intersection is described above under Portal 11 (Primary) in section 2.2.2.
- SR-522 and 80th Avenue NE (Signalized). This intersection is described above under Portal 44 (Primary) in section 2.2.2.

Figure 31 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing afternoon traffic volumes at the study intersections showed the peak hour starting between 4:30 and 5:00 p.m. Heavy vehicles comprised less than 2 percent of the traffic stream. Directional traffic flow was heavier southbound on NE 80th Street and eastbound on Bothell Way NE in the afternoon.

Level of Service

The WSDOT LOS standard threshold is LOS D, which was assumed for these study intersections. The study intersection of SR-522 and SR-527 currently operates at an unacceptable level of LOS E (Table 41).

Table 41. Unocal Corridor, Portal 12 – Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E
SR-522/80th Avenue NE	49	D

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 10 (Secondary)

Alternative Portal Sites

This secondary portal, if needed, is proposed to be located in the vicinity of NE 178th Street and 44th Avenue NE in the Lake Forest Park area. A final portal site has not yet been selected. There are four candidate sites:

- Site A is on the northwest corner of the intersection of NE 178th Street and Ballinger Way NE. It is situated on 5.6 acres that are mostly classified as single-family residential, with a small portion that is currently vacant.
- Site C is located on the southwest corner of the intersection of NE 178th Street and Brookside Boulevard NE. It is situated on 3.8 acres currently zoned for residential use.
- Site D is located in the northern half of Lake Forest Park Shopping Center at the southwest corner of NE 178th Street and Ballinger Way NE. This location is zoned for commercial use and is 4.0 acres.
- Site E is at the southwest corner of NE 178th Street and 44th Avenue NE. This site is currently zoned for single-family residential use and recreation/open space. It is smaller than the other portal locations at 2.1 acres.

All four candidate portal locations can be accessed directly via Ballinger Way NE or NE 178th Street. The proposed construction route to these sites begins on I-405 and continues west on Bothell Way NE. To access site A or D, the route continues northwest on Ballinger Way NE. To access site C or E from Bothell Way NE, the route goes along Brookside Boulevard NE and 44th Avenue NE to NE 178th Street.

Bothell Way NE is described above under Portal 12 (Secondary).

Ballinger Way NE within the proposed construction route is a level two-lane, north-south roadway with 6-foot paved shoulders for most of its length. This roadway is separated by landscaped medians, TWLT lanes, and painted centerlines in various sections. It is classified as a principal arterial by WSDOT and has a posted speed of 30 mph. This section is fairly residential with many driveways along the road, which is bordered by sidewalk, curb, and gutter. There is no designated parking. There are transit stops at major intersections.

Brookside Boulevard NE is a level two-lane, north-south, undivided roadway with 1- to 2-foot unpaved/dirt shoulders for most of the length. There is no designated parking, but access is unrestricted as there are many driveways in this residential area. 44th Avenue NE branches to the north of Brookside and possesses many of the same qualities. The posted speed limit is 35 mph. There are no transit facilities along this roadway.

NE 178th Street is a two-lane, east-west, undivided roadway with an estimated 1 to 2 feet of usable shoulder. Along the north side of the roadway, there is no designated parking and no sidewalk. There is curb and gutter and much landscaping. Along the south side there are designated parallel parking spaces, sidewalk, curb, and gutter. Access is unrestricted as there are many driveways in this residential area. The posted speed limit is 25 mph. This roadway is served by transit.

With proposed construction along the aforementioned streets, the following intersections are analyzed in this appendix:

- SR-522 (Bothell Way NE) and SR-527 (Bothell-Everett Highway) (Signalized). This intersection is described above under Portal 11 (Primary) in section 2.2.2.
- SR-522 (Bothell Way NE) and 80th Avenue NE This intersection is described above under Portal 44 (Primary) in section 2.2.2.
- SR-522 (Bothell Way NE) and 68th Avenue NE This intersection is described above under Portal 11 (Primary) in section 2.2.2.

Figure 32 depicts the alternative portal sites and the region surrounding the portal siting area. This figure includes lane channelization of the study intersections in the immediate vicinity of the sites. Some intersections are not shown because they are located a significant distance from the proposed portal siting area.

Traffic Volumes

Afternoon peak period intersection turning movements were collected in 2002/2003 to evaluate the existing traffic conditions in the portal study area. The existing afternoon traffic volumes at the study intersections showed the peak hour starting between 4:30 and

5:00 p.m. Heavy vehicles comprise less than 1 percent of the traffic stream. Directional flow is heavier eastbound on Bothell Way NE in the afternoon.

Level of Service

Table 42 shows the operations at the study intersections. The Lake Forest Park and WSDOT standard for roadway operations, which has been assumed for intersection operations as well, is LOS D. Two of the intersections currently operate below the LOS standard: Bothell Way NE/Bothell-Everett Highway and Bothell Way NE/68th Avenue NE.

Table 42. Unocal Corridor, Portal 10 – Existing Intersection P.M. Peak-Hour Levels of Service

Intersection	Average Delay (seconds per vehicle) ^a	LOS
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	67	E
Bothell Way NE (SR-522) at 80 th Avenue NE	49	D
Bothell Way NE (SR-522) at 68 th Avenue NE	103	F

a Includes deceleration time, stopped time, and acceleration time due to intersection controls

Portal 5 (Secondary)

Portal 5 is common to the Unocal and Route 9–195th Street corridors and is described in Section 2.2.2 above. See Figure 33 for the alternative portal sites and the region surrounding the portal siting area. The study intersection operations are summarized again in Table 43.

Table 43. Unocal Corridor, Portal 5 – Existing Intersection P.M. Peak-Hour Levels of Service

	Average Delay (seconds per	
Intersection	vehicle) ^a	LOS
Ballinger Way NE (SR-104) at 15th Avenue NE	59	E
SR-104 at I-5 Southbound Off-Ramp	29	С

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

2.4 Outfall Zones

Regular commercial and recreational maritime traffic is present in Puget Sound in the vicinity of outfall Zones 6 and 7S. The major ports nearest to the marine outfall zones are located in Seattle (15 miles to the south) and Everett (15 miles to the north). Vessels using these ports include oil tankers, cargo vessels, commercial fishing vessels, tugs, barges, cruise ships, and naval vessels.

The U.S. Coast Guard has established maritime traffic lanes for vessels using Puget Sound ports. The easternmost boundary of the traffic lanes is approximately 10,000 feet offshore from Point Edwards and 7,500 feet offshore from Point Wells. Commercial maritime traffic, such as fishing vessels, may operate outside of the established traffic lanes.

Tribal fishery management areas and associated marine transportation activities associated with tribal fishing are discussed and shown in Chapter 7 of the Final EIS.

2.4.1 Zone 6

The Edmonds Marina, located adjacent to Zone 6, was initially constructed in 1961 and was damaged by a storm in 1996. Restoration of the marina was completed in 1998. The marina provides the only public boating access in the highly populated 30-mile stretch between Seattle's Shilshole Bay and the Port of Everett. The marina extends 500 feet westward into Puget Sound and is dredged to a depth of 13 feet. The marina breakwater extends approximately 2,400 feet north and south along the shoreline. The marina includes 729 wet-moorage slips and 300 dry-storage spaces. More than 50 guest moorage slips are available for overnight and short-term stays. The Edmonds Marina is home to the largest charter fishing fleet on Puget Sound. During 2000, 99 percent of the available slips were occupied.

WSDOT provides regularly scheduled ferry service from the Edmonds Terminal to Kingston, Washington (approximately 25 round trips per day). The ferry terminal is located near downtown Edmonds, north of the marina, and extends approximately 500 feet westward into Puget Sound. Although the terminal is located north of Zone 6, the established ferry service route passes through Zone 6. However, it is not anticipated that construction vessel traffic would interrupt scheduled ferry service. Operation of the outfall would not impact ferry service.

An existing dock at Edwards Point, south of the Edmonds Marina, is located in Zone 6. The dock extends nearly 900 feet from the shoreline to a water depth of approximately 60 feet. The dock was used by the Unocal facility, but is no longer in service for maritime traffic.

The landside access to the Zone 6 outfall would be similar to the access to the Unocal Treatment Plant Site. Thus, the affected environment would coincide with that of the Unocal Site (Section 2.3.1).

2.4.2 Zone 7S

The Chevron Richmond Beach Asphalt Terminal at Point Wells uses a deep-water dock, located immediately north of Zone 7S, to transport materials to and from the industrial facility. The dock is approximately 1,000 feet long and lies nearly parallel to the shoreline at a distance of 200 feet offshore. Frequency of maritime traffic accessing the dock is currently three to four barges per week and, on average, one tanker ship per quarter. Chevron currently leases dock time to one customer. The customer typically moors a 600-foot vessel at the dock once every 1 to 2 months.

The landside access to the Zone 7S outfall would be similar to the access to Portal 19. Thus, the affected environment would coincide with those of the Portal (Section 2.2.2).

3 IMPACTS

This section describes the anticipated impacts on the affected transportation system during both construction and operation phases. Impacts are discussed separately for construction and operation of the treatment plant, conveyance system, and outfall.

Traffic volumes for each alternative were cumulative, meaning all of the Route 9 site treatment plant trips, conveyance system trips, and outfall trips were overlaid onto the background traffic volumes prior to performing the impact analyses.

In addition, a "no action" analysis was performed for each of the future year scenarios. This is because it represents a future "baseline" condition without the project, reflecting overall predicted traffic growth in the area. It also includes a number of assumptions about roadway improvements that would take place with or without the proposed project that affect the results of traffic modeling performed for this analysis. Discussion of the No Action Alternative provides a better understanding of the differences in traffic that are attributable to the project, as compared to those that are simply the result of area wide traffic growth.

Note that construction impacts are assessed for the initial phase of construction (36 mgd), whereas operational impacts are provided for all capacities: (36 mgd, 54 mgd, and (for Unocal only) 72 mgd. Impact analyses for any construction needed for future capacity expansions beyond the initial 36 mgd would be conducted at the time required for implementation.

Planned Improvements

A number of projects are currently planned for the potentially affected roadways. These projects, which range from pavement rehabilitation and overlay to roadway expansion to provide additional capacity, were included in the modeling of the future alternatives to account accurately for future conditions. Projects located along the potentially affected routes are listed below. Although these projects have been identified as needs, many have not yet received full funding and are not currently programmed for construction. As a result, the year of construction is not always known.

In addition to roadway projects, planned developments are also projected to occur within the project area. Potential construction and operational impacts were reviewed for the developments discussed below. As with the roadway projects, full funding and scheduling of the developments are not known. **SR-9.** Capacity improvements by WSDOT are planned for SR-9 (from SR-522 to SR-524) to be completed by November 2006 and farther north (to 176th Street SE) to start construction by 2010. Improvements include a new signal at the intersection of SR-9 and SR-522 Westbound ramps, a new through lane in each direction and a center two-way left-turn lane between SR-522 and 228th Street SE, as well as one additional through lane in each direction between 228th Street SE and SR-524 (Maltby Road). Sidewalks at selected locations are planned, and 8-foot-wide shoulders, which can be used by bicyclists, will be constructed.

Analyses both with and without the project were conducted. Impacts of the Route 9 improvements occurring at the same time as the Route 9 Brightwater Treatment Plant

construction were also analyzed.

Costco Warehouse. The Woodinville Costco Warehouse is planned to be constructed in the southwest quadrant of the intersection of SR-9 and SR-522 (eastbound ramps). Specific project information is not available for this project; however, for the purpose of the construction impact analyses, a 250,000-square-foot warehouse facility built with tilt-up construction methods was assumed. These assumptions are similar to other Costco facilities. Trip generation estimates during operations were provided by Costco (TSI, 2002). Construction and opening dates are currently not defined for this development.

Analyses in the vicinity of the Route 9 site were conducted both with and without the Costco project. For a conservative approach, peak construction activities of the Brightwater project and Costco development were assumed to occur concurrently in 2007.

Edmonds Crossing. The proposed Edmonds Crossing project is located in the City of Edmonds and the project is intended to provide a long-term solution to current operations and safety conflicts between ferry, rail, automobile, bus, and pedestrian traffic in downtown Edmonds. To do so, the project proposes to relocate the existing state ferry terminal from Main Street to another site farther south from the downtown core. A multimodal center would be established that would integrate the ferry, rail, and transit services into a single complex. The new complex would provide an upgraded ferry terminal designed to meet the operational requirements for accommodating forecast ferry ridership demand. Access would be provided from SR-104 from its current intersection with Pine Street. The Edmonds Crossing project currently has\$10 million in state funding and \$8 million in federal funding for design and land acquisition. The \$18 million in current funding represents approximately 10 percent of the total cost to develop and construct the project. The remaining funds have not yet been obtained. Thus, whether and when the proposed Edmonds Crossing is actually built will remain somewhat speculative until funding is secured at some point in the future.

The planned Edmonds Crossing project has been included as a sub-alternative to the Unocal site. Two scenarios were examined: construction-related activities restricted to the structural lid, and construction of the lid with Edmonds Crossing terminal facilities. To capture the worst-case scenario, construction of the Brightwater and Edmonds Crossing projects was assumed to be concurrent. Operations activities for the Edmonds Crossing were included for the 2040 54-mgd analyses.

Snohomish-Woodinville Road Widening. Snohomish County is planning improvements to Snohomish-Woodinville Road in 2005. The project will widen the roadway to three lanes from the King County line and match the WSDOT-proposed five-lane section at the SR-522 interchange. The three-lane section will consist of one travel lane in each direction and a center two-way left-turn lane. Other improvements include a shoulder on the east side of the roadway; a planter strip, curb, and sidewalk on the west side; and water detention ponds. As of August 28, 2003, the project as described here is fully funded and is expected to be completed by November 2005. The impacts of this project were not included in the traffic analysis because no intersections or roadway segments on this road were analyzed (Snohomish County, 2003; Lee, 2003).

SR-99. The City of Shoreline is planning improvements to the safety and mobility of pedestrians, transit users, people with disabilities, and drivers along Aurora Avenue N (SR-99) from N 165th Street to N 205th Street. Additionally, the project would improve the economic development potential, enhance the livability of adjacent communities, and support the City's Comprehensive Plan. The project would add business access and transit (BAT) lanes, curbs, gutters, landscaping/street furnishings, and sidewalks on both sides; the center median safety lane would be landscaped, with left turn and U-turn provisions; and a traffic signal would be installed at N 182nd and N 195th Streets. All traffic signals would be interconnected and include pedestrian crossings. Transit stops with new shelters, new street lighting, and underground utilities would be installed. Improvements to the existing stormwater drainage, including water quality, would also be implemented. Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis (City of Shoreline, 2003 and 2002).

SR-104. Asphalt pavement overlay is planned for the segment between 15th Avenue NE and 35th Avenue NE by the end of 2005. Intersection capacity improvements are planned for the intersection of SR-104 (Edmonds Way) and 100th Avenue West. Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

SR-522. A number of projects are planned for construction along SR-522 over the next 10 years. Pavement and drainage modifications are planned for the vicinity of 80th Avenue NE and Swamp Creek. High-occupancy vehicle (HOV) lane priority treatments, including development of queue bypass lanes (requiring roadway expansion), are planned for construction by the end of 2003 at several intersections along SR-522 from I-5 to I-405. In addition, HOV lanes (roadway widening) are planned for construction by the end of 2007 for the segment between SR-527 and I-405. East of Woodinville, SR-522 will be widened by a lane in each direction to SR-2 in Monroe by 2011. Interchanges will also be constructed by 2007 to remove at-grade intersections between I-405 and SR-2. Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis.

SR-522 Multimodal Corridor at Kenmore, Phase I. The City of Kenmore has secured funding to complete several improvements to the SR-522 (NE Bothell Way) corridor. The goal is to ease congestion through Kenmore, increase pedestrian and vehicular safety, improve the appearance of the corridor, and improve the function of the major intersections within the city. The City has received State and Federal grant funds to complete these improvements as well as contributions from the Washington State Department of Transportation (WSDOT), King County, the Northshore Utility District, and private developers. The project is scheduled for construction in 2005 and 2006.

The proposed improvements include:

- The realignment of the 61st Avenue NE/SR-522 intersection
- Modifications to the intersection of 65th Avenue NE and SR-522
- Modifications to the intersection of 68th Avenue NE and SR-522

- The realignment of the two intersections at NE 181st Street and 68th Avenue NE into a single intersection
- The realignment of the intersection of 73rd Avenue NE and SR-522
- Construction of an underpass for the Burke-Gilman Trail at 73rd Avenue NE
- The installation of landscaped medians on SR-522 between 65th Avenue NE and 73rd Avenue NE
- The improvement of 68th Avenue NE from NE 175th to NE 185th Streets
- The addition of landscaping and sidewalks at several locations in the corridor.

Analyses both with and without the improvements at the intersections of SR-522/68th Avenue NE/68th Avenue NE/NE 181st Street were conducted (City of Kenmore, 2003).

SR-522 Multimodal Corridor at Kenmore, Phase II. Phase II of Kenmore's SR-522 project is planned to improve safety, circulation, and operation of automobile, transit, and non-motorized users of the roadway corridor. Phase II will extend the SR-522 business and transit (BAT) lane system from 73rd Avenue NE to the eastern city limits. The project is in the City's 6-year Transportation Improvement Plan (TIP) and has received state, federal, and Sound Transit funds. The project construction is expected to take place sometime between 2007 and 2009.

The proposed improvements include:

- Widening of the roadway for BAT lanes from 73rd Avenue NE through 83rd Avenue NE
- Improvements to 80th Avenue NE north of SR-522
- A traffic signal at the entrance to Kenmore Lanes
- Medians and access management improvements between 73rd Avenue NE and the eastern Kenmore city limits
- A traffic signal at 83rd Place NE
- Replacement of the SR-522 Swamp Creek bridge
- Sidewalks along the north side of SR-522 to improve pedestrian safety and access to and from the transit facilities.

The project is in the City's 6-year TIP and has received state, federal, and Sound Transit funds. Construction is expected to take place sometime between 2007 and 2009. Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis (City of Kenmore, 2003).

SR-522 Multimodal Corridor at Bothell, Phase I. This City of Bothell project is still in the early stages. It does not have a preferred alternative, and no funding has been secured. Three primary alternatives are being reviewed at this time. A preliminary preferred alternative is expected to be selected in October or November of 2003. An expected completion date is unknown at this time. Because project timing is uncertain, neither the

construction impacts nor the capacity benefits of this project were included in the analysis (City of Bothell, 2003).

Beardslee Boulevard/Ross Road. The connection to Ross Road from the curve where NE 195th Street becomes Beardslee Boulevard is too close to the signalized freeway ramps. In addition, future I-405 improvements will eliminate this intersection. Therefore, the City has identified a need to design and build a connection while there are opportunities to work with the redevelopment of properties affected by this new connection. Four alternative locations for a connector road were presented to the City Council in March 2003 subsequent to an open house on the subject. The selected location is midway between the NE 195th Street intersection and the signal providing access to the University of Washington/Cascadia campus on Beardslee Boulevard. From there the connector heads northwest to Ross Road. Ross Road to the south of this intersection will be a cul-de-sac at that point. The new intersection on Beardslee Boulevard will be signalized, while the existing intersection will be closed to all movements except possibly right-hand turns from NE 195th Street. The expected start date and availability of funding are unknown at this time. Because project timing is uncertain, neither the construction impacts nor the capacity benefits of this project were included in the analysis (City of Bothell, 2003).

NE 180th Street/132nd Avenue NE. The City of Bothell has plans to signalize this intersection and give it increased capacity in the near future. The project is fully funded and construction is estimated to be complete by 2005. In conjunction with the project, the SR-522/132nd Avenue NE interchange adjacent to 180th/132nd would be rechannelized to make use of the existing roadway width. Analyses both with and without this project were conducted (Safavian, 2003).

NE 195th Street. Asphalt pavement overlay is planned by 2004 for the segment of NE 195th between 120th Avenue NE and North Creek Parkway.

Bicycle and Pedestrian Facilities. Several projects are planned:

- Snohomish-Woodinville Road. Snohomish County Project #RC1079 includes construction of a shoulder and sidewalk along the east side of the roadway between SR-522 and the King County line.
- **SR-9–SR-522 to 176th Street SE Widening.** This project will provide sidewalks in selected locations. Initial improvements funded by the State's "Nickel Funding Package" will be implemented from SR-522 to 176th Street SE. Additional improvements are currently slated for inclusion in the Regional Transportation Improvement District (RTID) package of projects for Snohomish County.
- Snohomish County Bikeways. The Snohomish County Comprehensive Plan (2000 update) and Mill Creek East UGA Plan (adopted May 2002) indicate plans for bikeways along SR-524, SR-9, 228th Street SE (west of SR-9), 180th Street SE (west of SR-9), and Broadway Avenue (north of SR-524).

No Action Alternative Impact Analysis

The No Action analysis included several evaluations. Year 2010 was evaluated as the assumed baseline for opening-year operational impacts. Year 2040 was chosen to represent operational impacts at full build-out of the wastewater treatment plant.

Anticipated traffic volumes, LOSs, and predicted delay for all affected routes in the study area are shown in Tables 44 and 45 for both 2010 and 2040. Analyses were also performed for Year 2007 during the peak construction period of the plant and portal sites. Figures 34, 35, and 36 depict the respective forecast year traffic volumes.

In 2007 and 2010, LOSs for all roadway segments are expected to operate similarly to existing conditions. With increased traffic volumes caused by general population growth, the study intersections are expected to remain at their existing acceptable levels as defined by the responsible jurisdiction or continue at LOS F, with the exception of one WSDOT roadway segment. That segment is SR-104 west of I-5, which is projected to decrease from an existing LOS E to LOS F by Year 2010. By 2040, three additional segments under WSDOT jurisdiction—Edmonds Way north of 100th Avenue West and SR-99 north and south of SR-104—are predicted to drop to LOS E/F conditions as a result of regional traffic growth.

Table 45 presents projected future conditions at key study intersections under the No Action Alternative. By 2007, three of the No Action study intersections would change from LOS D to LOS E as compared to the existing conditions during the afternoon peak; Aurora Avenue/244th Street SE, Bothell-Everett Highway/228th Street SE, and Edmonds Way/100th Avenue W. One intersection would decline from LOS E to F conditions; Bothell Way NE/Bothell Everett Highway. All of the intersections that are projected to decline to unacceptable levels by 2007 are under state jurisdiction. By 2040, only two of the study intersections are expected to operate at acceptable conditions: Edmonds Way/Dayton Street and Edmonds Way/Pine Street. Both of these intersections are along a WSDOT route within the City of Edmonds.

Table 44. Study Segment P.M. Peak Hour Levels of Service— No Action Alternative

Location	2007 No Action P.M. Peak LOS	2010 No Action P.M. Peak LOS	2040 No Action P.M. Peak LOS				
Route 9 Site and 195th Street Corridor (including influent corridor)							
SR-104, west of Interstate 5	Е	F	F				
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С	С				
SR-99, south of SR-104	D	D	F				
SR-99, north of SR-104	С	С	F				
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F	F				
Bothell Way NE (SR-522), west of Bothell- Everett Hwy (SR-527)	С	С	С				
NE 195th Street, east of Interstate 405	E	E	E				
228th Street SE, west of SR-9	С	С	С				
228th Street SE, east of Bothell-Everett Hwy (SR-527)	В	В	С				
SR-9, north of SR-522 ^a	F	F	F				

Table 44. Study Segment P.M. Peak Hour Levels of Service— No Action Alternative

Location	2007 No Action P.M. Peak LOS	2010 No Action P.M. Peak LOS	2040 No Action P.M. Peak LOS					
Route 9 Site and 228th Street Corridor (including influent corridor)								
SR-104, west of Interstate 5	Е	F	F					
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С	С					
SR-99, south of SR-104	D	D	F					
SR-99, north of SR-104	С	С	F					
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F	F					
Bothell Way NE (SR-522), west of Bothell- Everett Hwy (SR-527)	С	С	С					
NE 195th Street, east of Interstate 405	Е	E	Е					
228th Street SE, west of SR-9	С	С	С					
228th Street SE, east of Bothell-Everett Hwy (SR-527)	В	В	С					
SR-9, north of SR-522 ^a	F	F	F					
Unocal Site and Corridor								
Edmonds Way (SR-104), north of Pine Street	В	В	В					
Edmonds Way (SR-104), north of 100th Avenue W	С	С	E					
Edmonds Way (SR-104), north of SR-99	В	В	В					
SR-104, west of Interstate 5	E	F	F					
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С	С					
SR-99, south of SR-104	D	D	F					
SR-99, north of SR-104	С	С	F					
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F	F					
Bothell Way NE (SR-522), west of Bothell- Everett Hwy (SR-527)	С	С	С					
NE 195th Street, east of Interstate 405	Е	Е	Е					

^a Does not include WSDOT SR-9 widening project

Table 45. Study Intersection P.M. Peak-Hour Levels of Service and Delay— No Action Alternative

	20	07 No Action	20	010 No Action	20	040 No Action
Intersection	LOS	Delay (seconds per vehicle) ^a	LOS	Delay (seconds per vehicle) ^a	LOS	Delay (seconds per vehicle) ^a
Route 9 Site and 195th Str	eet C	orridor (includir	ng infl	uent corridor)		
Aurora Avenue (SR-99) at 244th Street SW	Е	58	Е	63	F	127
SR-104 at I-5 Southbound Off-Ramp	С	32	D	36	F	118
Ballinger Way NE (SR-104) at 15th Avenue NE	Е	66	Е	73	F	168
Ballinger Way NE (SR-104) at Bothell Way NE (SR- 522)	F	212	F	229	F	401
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR- 527)	F	88	F	105	F	335
SR-9 at 228th Street SE ^b	D	43	D	44	F	82
SR-9 at SR-522 Eastbound Ramps ^b	D	48	D	53	F	114
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	С	21	С	22	F	52
SR-9 at SR-524 (Maltby Road)	Е	80	F	88	F	185
Route 9 Site and 228th Str	eet C	orridor (includir	ng infl	uent corridor)		
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR- 527)	F	88	F	105	F	335
SR-9 at 228th Street SE ^b	D	43	D	44	F	82
Bothell-Everett Hwy (SR- 527) at 228th Street SE	Е	58	Е	65	F	209
SR-9 at SR-522 Eastbound Ramps ^b	D	48	D	53	F	114
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	С	21	С	22	F	52
SR-9 at SR-524 (Maltby Road)	E	80	F	88	F	185

Table 45. Study Intersection P.M. Peak-Hour Levels of Service and Delay— No Action Alternative

	2007 No Action		20	2010 No Action		2040 No Action	
Intersection	LOS	Delay (seconds per vehicle) ^a	LOS	Delay (seconds per vehicle) ^a	LOS	Delay (seconds per vehicle) ^a	
Unocal Site and Corridor							
Edmonds Way (SR-104) at Dayton Street	В	15	В	16	D	53	
Edmonds Way (SR-104) at Pine Street (unsignalized)	С	17	С	18	D	29	
Edmonds Way (SR-104) at 100th Avenue W	Е	60	Е	66	F	143	
Aurora Avenue (SR-99) at 244th Street SW	Е	58	Е	63	F	127	
SR-104 at I-5 Southbound Off-Ramp	С	32	D	36	F	118	
Ballinger Way NE (SR-104) at 15th Avenue NE	E	66	E	73	F	168	
Ballinger Way NE (SR-104) at Bothell Way NE (SR- 522)	F	212	F	229	F	401	
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	F	88	F	105	F	335	

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

LOS analyses for intersections along SR-9 were conducted for conditions with the SR-9 capacity improvements (Table 46). The 2007 analyses assume the improvements are under construction. The analyses also conservatively assume that no traffic diversions occur due to the lack of convenient parallel routes. Minor peak spreading would likely occur. The 2010 and 2040 analyses assume completion of the roadway improvement project.

Delays will increase during the roadway construction activities; however, upon completion of the project, all intersections are projected to operate at acceptable levels, as defined by WSDOT thresholds. The study roadway segment of SR-9 north of SR-522 is also expected to operate well, at LOS C levels, once the capacity improvements are completed.

^b Does not include WSDOT SR-9 widening project

Table 46. SR-9 Study Intersection P.M. Peak-Hour Levels of Service and Delay—No Action Alternative with SR-9 Roadway Improvements

		007 (ongoing onstruction)	2010 (improvements completed)		2040 No Action (improvements completed)	
Intersection	LOS	Delay (seconds per vehicle) ^a	LOS	Delay (seconds per vehicle) ^a	LOS	Delay (seconds per vehicle) ^a
SR-9 at 228th Street SE	D	54	С	21	С	28
SR-9 at SR-522 Eastbound Ramps	D	48	С	28	D	37
SR-9 at SR-522 Westbound Ramps (unsignalized)	С	21	В	16	С	20
SR-9 at SR-524 (Maltby Road)	F	117	С	25	С	28

^a Includes deceleration time, stopped time, and acceleration time due to intersection controls

3.1 Route 9 Site (Preferred Alternative)

3.1.1 Route 9 Treatment Plant

Two types of potential impacts were evaluated for the Route 9 treatment plant site. Potential impacts may occur along access routes as a result of traffic generated during construction and as a result of ongoing operation and maintenance of the plant. Construction impacts were assumed to occur during the year of overall peak construction impacts, 2007. The construction schedule is documented in the separately bound "Supplemental Traffic Information" and can be reviewed at King County.

The existing businesses currently occupying the Route 9 site would be displaced by the proposed Brightwater Route 9 site development resulting in trip credits to the transportation network. Driveway counts were performed in February 2003 by CH2M HILL to estimate the existing traffic volumes. The peak hour volume at each business represents the highest one-hour volume within the p.m. peak traffic period of the adjacent street. The existing driveway traffic is shown in Table 47.

The existing businesses' trip generation numbers were also estimated using the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 6th Edition. Based on these data about the businesses currently operating at the Route 9 site, including the Grange Hall, an approximation was made of the peak-hour and daily trips currently generated onsite by those businesses. The approximations were 230 to 270 afternoon peak-hour and 700 to 900 daily trips. Appendix 16-A, Transportation Concurrency: Route 9 Plant Site, provides greater detail on the displacement of existing land use and vehicle trips.

Table 47. Route 9 Site—Summary of Existing Driveway Traffic^a

	P.M. Peak Hour			
Existing Business Name(s)	Trips In	Trips Out	Total Trips	
StockPot, Inc., Quality Business Systems, and Bear Creek Grange Hall ^a (shared driveways at westbound approach of SR-9 and 228th Street SE)	18	62	80	
Active Excavators	1	17	18	
Wild West Mustang Ranch	1	3	4	
CT Sales	1	6	7	
Woody's Auto Yard	6	8	14	
Insurance Auto Auctions	12	15	27	
Fitz Auto Parts	30	32	62	
Total	69	143	212	

The Grange Hall vehicular generation was observed to be minimal during peak-hour traffic conditions

Source: Counts performed by CH2M HILL on February 11 and 18, 2003

Construction Impacts

Transportation System

The potential impacts that could result from construction activity at the Route 9 treatment plant site are related mainly to increased traffic volumes associated with earthwork and material delivery. Although many truck trips would be generated by construction, their effect on traffic operations and LOS is dependent on overall background traffic in the system. Unless specifically noted, the analyses took a conservative approach, assuming no SR-9 improvements were constructed. Additional trips associated with the most intense site construction activity represent an approximate 1.5 percent increase in total daily traffic along SR-9 just north of SR-522. The net total trip generation of the Route 9 site during construction is estimated to be slightly higher than the existing trips from the displaced businesses.

The methodology used to analyze construction traffic impacts reported herein did not follow Snohomish County guidelines. As a result, segment and intersection operation results would be different. King County has agreed to analyze Route 9 site construction impacts using Snohomish County's methodology at the time of permitting.

Impacts to roadway segment afternoon peak-hour LOS along access routes would be minor, with no changes in the LOS compared with no-build conditions. Most of the intersections along access routes may experience slight increases (1 to 4 seconds) in intersection delays. Impacts to bicycle, pedestrian, transit, and freight travel would be minimal.

A higher number of accidents could occur as a result of the increased traffic within the study area associated with construction activities. However, this relates to the potential

exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

Construction Traffic Impact Analysis (2007)

As shown in Table 48, the construction of a treatment plant at the Route 9 site would generate an estimated total of 852 one-way daily vehicle trips for the peak period of construction (2007), including 114 earthwork, 64 concrete, and 32 material trucks. Each trip represents one leg of a round trip. Approximately 642 of the daily trips would be made by workers who would travel to and from the site. So that the traffic assessment would represent the worst-case traffic operating conditions, the peak construction traffic was assumed to happen during the peak hour of the surrounding roadway. Using that assumption, up to 319 site construction-related vehicle trips would occur during the afternoon peak-hour period. The overall trip generation to the project site is made up of the new trips generated by the construction of the treatment plant with a reduction of the existing trips that are associated with the displaced land uses. The net total trip generation of the Route 9 site during construction is estimated at 107 additional vehicles during the peak-hour period. A treatment plant portal would also be constructed with the 228th Street alternative only. The treatment plant portal would increase peak hour trips by 53, for a net total increase of 160 vehicles. Figures 37 and 38 show the construction traffic conditions for the 195th Street corridor and 228th Street corridor alternatives, respectively. The figures illustrate the vehicular volumes and means of access for trucks and workers during peak construction periods for the Route 9 treatment plant site. The figures also represent the removal of trips from the roadway system as a result of the displacement of existing businesses.

Construction traffic impacts are summarized in Tables 49 and 50 for roadway segments and study intersections. All roadway segments remain the same as the 2007 No Action conditions, while the delays at most of the intersections would be a few seconds greater (4 seconds or less) compared with pre-construction conditions. The intersection of SR-9 at 228th Street SE would, however, experience a significantly longer average vehicle delay during construction of either of the Route 9 corridors. The LOS would change from D to F with the Brightwater traffic. This is a significant impact and would be mitigated by the mitigation measures proposed in Section 4.2. Increased delays due to construction activities would also cause the SR-9 at SR-522 Eastbound ramps intersection to change from LOS D to E conditions.

Table 48. Route 9 Site Treatment Plant — **Estimated Project Construction Trips**^a

Site	Daily Trips	P.M. Peak-Hour Trips
Route 9 Site – 195th Street Corridor		
Earthwork Truck Trips	114	14
Concrete Truck Trips	64	6
Material/Equipment Truck Trips	32	3
Construction Worker Trips ^b	642	296
Total Trips to and from the Route 9 Site	852	319
Existing Trips Displaced ^c		212
Net New Trips		107
Route 9 Site – 228th Street Corridor		
Earthwork Truck Trips	114 (156)	14 (19)
Concrete Truck Trips	64 (64)	6 (6)
Material/Equipment Truck Trips	32 (54)	3 (5)
Construction Worker Trips ^b	642 (734)	296 (342)
Total Trips to and from the Route 9 Site	852 (1008)	319 (372)
Existing Trips Displaced ^c		212
Net New Trips		107 (160)

^a Each trip represents one direction (inbound or outbound) of a round trip
^b Includes field staff
^c Source: Counts performed by CH2M HILL on February 18, 2003 (Table 47)
Note: Numbers in parentheses (xx) represent trips for the Treatment Plant construction and the adjacent Treatment Plant Portal construction for the 228th Street alternative only Source: URS, Inc., August 19, 2003

October 2003 83

Table 49. Route 9 Site- Estimated P.M. Peak-Hour Traffic Conditions for Roadway Segments During Construction and Operation

Segment	2007 No Action LOS	2007 Construction, Route 9 Site LOS	2010 No Action LOS	2010 Operation (36 mgd) LOS
Route 9 Site – 195th Street Corridor				
SR-104, west of Interstate 5	Е	E	F	F
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С	С	С
SR-99, south of SR-104	D	D	D	D
SR-99, north of SR-104	С	С	С	С
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F	F	F
Bothell Way NE (SR-522), west of Bothell-Everett Hwy (SR-527)	С	С	С	С
NE 195th Street, east of Interstate 405	Е	Е	Е	E
228th Street SE, west of SR-9	С	С	С	С
228th Street SE, east of Bothell-Everett Hwy (SR-527)	В	В	В	В
SR-9, north of SR-522 ^a	F	F	F	F
Route 9 Site – 228th Street Corridor				
SR-104, west of Interstate 5	E	E	F	F
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С	С	С
SR-99, south of SR-104	D	D	D	D
SR-99, north of SR-104	С	С	С	С
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F	F	F
Bothell Way NE (SR-522), west of Bothell-Everett Hwy (SR-527)	С	С	С	С
NE 195th Street, east of Interstate 405	Е	Е	Е	E
228th Street SE, west of SR-9	С	С	С	С
228th Street SE, east of Bothell-Everett Hwy (SR-527)	В	В	В	В
SR-9, north of SR-522 ^a	F	F	F	F

^a Does not include WSDOT SR-9 widening project

Table 50. Route 9 Site and Corridors – Estimated Intersection P.M. Peak-Hour **Traffic During Construction and Operation**

	2007 N	o Action	2007 Coi	nstruction	2010 N	2010 No Action		2010 Operation (36 mgd)	
Intersection	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	
Route 9 Site - 195th Street Corri	dor								
Aurora Avenue (SR-99) at 244th Street SW	E	58	E	62	E	63	Е	63	
SR-104 at I-5 Southbound Off- Ramp	С	32	С	33	D	36	D	36	
Ballinger Way NE (SR-104) at 15th Avenue NE	E	66	E	69	E	73	E	73	
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	F	212	F	212	F	229	F	229	
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	F	88	F	92	F	105	F	105	
SR-9 at 228th Street SE ^b	D	43	F	90	D	44	D	42	
SR-9 at SR-522 Eastbound Ramps ^b	D	48	E	58	D	53	D	48	
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	С	21	С	24	С	22	С	22	
SR-9 at SR-524 (Maltby Road)	Е	80	Е	73	F	88	Е	78	
Route 9 Site - 228th Street Corri	dor								
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	F	88	F	92	F	105	F	105	
SR-9 at 228th Street SE ^b	D	43	F	117	D	44	D	42	
Bothell-Everett Hwy (SR-527) at 228th Street SE	Е	58	E	64	Е	65	E	65	
SR-9 at SR-522 Eastbound Ramps ^b	D	48	E	62	D	53	D	48	
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	С	21	D	26	С	22	С	22	
SR-9 at SR-524 (Maltby Road)	Е	80	Е	74	F	88	Е	78	

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Effect of Concurrent Construction (SR-9 Improvement Project)

Construction impact analyses assuming concurrent SR-9 improvements were performed for intersections along SR-9. Minimal diversions were assumed due to the limited parallel route opportunities within the project vicinity. The increased delays, in conjunction with the limited alternate routes, may also cause an extended peak traffic period.

October 2003 85

Does not include WSDOT SR-9 widening project

The analysis of the concurrent condition assumed that both the Route 9 treatment plant and SR-9 roadway improvement projects would be in the midst of peak construction activities during the year 2007. WSDOT's current plans assume the portion of the SR-9 improvement project between SR-522 and SR-524 to be completed by 2006, with its peak construction period likely occurring between 2005 and 2006. Analyzing the construction year of 2007 would represent the 'worst-case' traffic condition of both projects in the event that the SR-9 project construction schedule is delayed.

Table 51 depicts an estimate of traffic operations during construction of the SR-9 capacity improvements and during concurrent construction of both the roadway improvements and the treatment plant construction. For comparison purposes, Table 50 shows traffic operations if Brightwater is not constructed concurrently with the SR-9 improvements. The SR-9/228th Street SE intersection is projected to have an increase of delay and an LOS change from D to F (Table 51). The SR-9/SR-522 Eastbound ramps intersection is also projected to operate at LOS E. The SR-9 roadway segment north of SR-522 is projected to remain at LOS F conditions. All of the SR-9 intersections are under state jurisdiction.

Table 51. SR-9 Study Intersections P.M. Peak-Hour Levels of Service and Delay—Concurrent Brightwater and SR-9 Roadway Improvements Construction

		n, SR-9 Roadway construction Only ^b	2007 Construction, Both SR-9 Roadway Improvements and Brightwater Facilities	
Intersection	LOS	Delay ^a	LOS	Delay ^a
Route 9 Site - 195th Street Co	rridor			
SR-9 at 228th Street SE	D	54	F	114
SR-9 at SR-522 Eastbound Ramps	D	48	E	58
SR-9 at SR-522 Westbound Ramps (Unsignalized)	С	21	С	24
SR-9 at SR-524	F	117	F	108
Route 9 Site - 228th Street Co	rridor			
SR-9 at 228th Street SE	D	54	F	145
SR-9 at SR-522 Eastbound Ramps	D	48	E	62
SR-9 at SR-522 Westbound Ramps (Unsignalized)	С	21	D	26
SR-9 at SR-524	F	117	F	109

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls

Effect of Concurrent Construction (Costco Warehouse Development)

Construction impact analyses assuming concurrent Costco Warehouse construction were performed for intersections along SR-9.

^b LOS calculated based on intersection capacity during the construction of the SR-9 Roadway Improvements project

The analysis of the concurrent condition assumed that both the Route 9 treatment plant and Costco Warehouse project would be under construction during the year 2007. The year 2007 represents the peak construction of the Brightwater project. Currently the construction schedule for the Costco project is unknown. Analyzing the construction year of 2007 would ensure that the worst-case traffic condition of both projects has been analyzed.

Table 52 depicts an estimate of traffic operations during concurrent construction of the treatment plant and Costco Warehouse. Traffic operations with both the treatment plant and Costco construction traffic would be similar to operations with only the treatment plant. The SR-9/SR-522 Westbound ramps intersection is projected to have a slight increase of delay that would cause an LOS change from C to D for the 195th Street alternative.

Table 52. Route 9 Site – Estimated Intersection P.M. Peak-Hour Traffic with the Costco Warehouse Development

		atment Plant truction	2007 Treatment Plant and Costco Construction		
Intersection	LOS	Delay ^a	LOS	Delay ^a	
Route 9 Site - 195th Street Corrid	lor				
SR-9 at 228th Street SE ^b	F	90	F	90	
SR-9 at SR-522 Eastbound Ramps ^b	Е	58	E	58	
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	С	24	D	26	
SR-9 at SR-524 b (Maltby Road)	E	73	E	74	
Route 9 Site - 228th Street Corrid	lor				
SR-9 at 228th Street SE ^b	F	117	F	117	
SR-9 at SR-522 Eastbound Ramps ^b	E	62	Е	62	
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	D	26	D	28	
SR-9 at SR-524 ^b (Maltby Road)	Е	74	Е	75	

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls

<u>Effect of Cumulative Projects (SR-9 Improvements and Costco</u> Warehouse Operations)

A cumulative analyses, which would represent the highest impact of all planned projects within the project vicinity, was performed. The cumulative analysis assumed concurrent peak construction activities of the SR-9 roadway improvements and Brightwater Treatment Plant, as well as Costco Warehouse operational traffic.

b Does not include WSDOT SR-9 widening project

Table 53 depicts an estimate of the cumulative traffic operations. Delays are expected to increase at all of the study intersections. LOS analyses show that all of the SR-9 study intersections would operate at LOS E/F levels.

Table 53. Route 9 Site – Estimated Intersection P.M. Peak-Hour Traffic with Cumulative Project Impacts

2007 with Brightwater Treatment Plant Construction, SR	-9
Construction and Costco Warehouse Operations	

Intersection	LOS	Delay ^a
Route 9 Site - 195th Street Corridor		
SR-9 at 228th Street SE ^b	F	123
SR-9 at SR-522 Eastbound Ramps ^b	E	59
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	Е	40
SR-9 at SR-524 ^b (Maltby Road)	F	113
Route 9 Site - 228th Street Corridor		
SR-9 at 228th Street SE ^b	F	157
SR-9 at SR-522 Eastbound Ramps ^b	E	61
SR-9 at SR-522 Westbound Ramps ^b (unsignalized)	Е	46
SR-9 at SR-524 ^b (Maltby Road)	F	114

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Two different stages of project build-out were evaluated for the Route 9 plant site during plant operation and maintenance – 36-mgd capacity and 54-mgd capacity. The treatment plant would be designed to treat 36 mgd by 2010, with features to allow for future expansion to 54 mgd in 2040.

The 36-mgd plant would generate 179 total trips per day, including 120 employee trips, 6 biosolids/grit truck trips, 4 chemical truck trips, approximately 10 visitor trips, and 95 community-oriented building trips. For worst-case analysis, afternoon peak-hour trips would total 62, with 2 of those being truck trips. By 2040, at 54 mgd, daily trip generation would total 301 trips, with 78 occurring in the afternoon peak hour. The overall trip generation of the project site during 2010 operations, taking into account the reduction of existing trips that are associated with the displaced land uses, is a net decrease of approximately 150 vehicles during the peak hour. During 2040 operations, a net decrease of 134 vehicles is estimated for the adjacent roadway network during the peak hour. Table 54 lists traffic volumes generated by the treatment plant under both 2010 and 2040 conditions.

^b LOS calculated based on intersection capacity during the construction of the SR-9 Roadway Improvements project.

Table 54. Route 9 Site Treatment Plant—Estimated Generated Traffic Trips^a During Operation

_	36	mgd (2010)	54 mgd (2040)		
Trip/Vehicle Type	Daily	P.M. Peak Hour	Daily	P.M. Peak Hour	
Employee Trips/Passenger Cars	120	40	180	55	
Biosolids/Grit Truck Trips	6	1	8	2	
Chemical Truck Trips	4	1	6	1	
Visitors/Passenger Trips	10	2	12	2	
Community-Oriented Building	95	18	95	18	
Total Trips to and from the Route 9 Site	235	62	301	78	
Existing Trips Displaced ^b		(212)		(212)	
Net New Trips		-150		-134	

^a Each trip represents one direction (inbound or outbound) of a round trip.

Source: Revised Brightwater Siting Project Phase 3 Technical Evaluation (April 2003)

The number of employees at the treatment plant would range from 53 (at 36 mgd) to 75 (at 54 mgd), plus an additional 3 to 7 full time employees (FTEs) for the community-oriented building. Two work shifts are projected; the maximum number of employees would be during the day shift and would be 39 to 49, including process, administration, maintenance, and coordination personnel. The day shift would also include the 3 to 7 FTEs for the community-oriented building.

The Route 9 site would provide parking internally to accommodate the following parking needs:

- Administration building 50 stalls
- Maintenance building 20 stalls
- Community-oriented building 100 stalls
- Solids handling 10 stalls

2010 Operations

The number of trips generated by the project represents a minor decrease in traffic as compared to the No Action Alternative. As a result, no potential operational impacts have been identified for the Route 9 site. Estimated traffic conditions in 2010 with operation of the Route 9 treatment plant are illustrated in Figure 39. Tables 49 and 50 summarize the results of the assessment of impacts related to treatment plant construction and operation for roadway segments and intersections, respectively.

The results of the concurrency LOS analyses differed for several of the study intersections as compared to those reported in Table 50. Steps were taken to reconcile the differences in methodology and make the results more consistent. These included use of data on signal timing and other inputs provided by Snohomish County and comparison with the calibrated Synchro traffic model intersection delay. Using the Snohomish County methodology, the SR-9/SR-522 Westbound ramps were estimated to operate at

^b Source: Counts performed by CH2M HILL on February 18, 2003 (Table 46)

LOS F conditions in Year 2010 both with and without the Brightwater project. The SR-9/228th Street SE intersection is projected to operate at LOS F conditions without the project, and LOS C with the project. The SR-9/SR-524 intersection is projected to operate at LOS E both with and without the Brightwater project. Although different methodologies were used, the results of both analyses are consistent in showing that the delays with the Brightwater project traffic would be less than in the No Action Alternative. As a result of the decreased traffic, the Brightwater 36-mgd treatment plant operations do not require impact fees or mitigation measures per the Snohomish County concurrency regulations. Appendix 16-A, Transportation Concurrency: Route 9 Plant Site, presents a more detailed discussion of the concurrency analyses and regulations.

The project would have minimal impacts to freight, transit, bicycle, and pedestrian traffic. Fewer accidents could potentially occur as a result of the decreased traffic within the study area due to operation activities. However, this relates to the potential exposure to a lesser number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

LOS analyses assuming completion of the SR-9 improvements were performed for all SR-9 intersections. All intersections on SR-9 are projected to operate at acceptable LOS C or better (WSDOT standards) with the 2010 Brightwater Route 9 site operations traffic. The SR-9 roadway segment north of SR-522 is also projected to operate at LOS C conditions.

LOS analyses assuming Costco operations were also performed. Intersections are projected to operate similarly to Brightwater operations conditions.

2040 Operations

In comparison to the 2010 operational conditions, two additional segments would operate within the LOS F range under the 2040 No Action Alternative: SR-99 both north and south of SR-104. All of the study intersections would operate at LOS F conditions. The project-related trips generated by the treatment plant would not result in any changes in segment or intersection LOS compared to the No Action Alternative with the exception of the SR-9/SR 522 Westbound Ramp and SR-9/228th intersections. In 2040, these intersections would operate at a higher level of service (LOS E instead of F) with the Brightwater project when compared to No Action because the treatment plant would generate fewer trips than existing uses at the site. Tables 55 and 56 summarize the 2040 levels of service. The estimated traffic under 2040 conditions is shown in Figure 40.

The project would have minimal impacts to freight, transit, bicycle, and pedestrian traffic. Fewer accidents could potentially occur as a result of the decreased traffic within the study area due to operation activities. However, this relates to the potential exposure to a lesser number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

LOS analyses assuming completion of the SR-9 improvements were performed for all SR-9 intersections. The traffic operations analyses showed similar results to the 2010 conditions; however, the SR-9/SR-522 EB ramps intersection would operate at LOS D by 2040.

Table 55. Route 9 Site- Estimated 2040 P.M. Peak-Hour Traffic Conditions for Roadway Segments During Operation

Segment	2040 No Action LOS	2040 Operation (54 mgd)LOS
Route 9 Site – 195th Street Corridor		
SR-104, west of Interstate 5	F	F
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С
SR-99, south of SR-104	F	F
SR-99, north of SR-104	F	F
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F
Bothell Way NE (SR-522), west of Bothell-Everett Hwy (SR-527)	С	С
NE 195th Street, east of Interstate 405	E	E
228th Street SE, west of SR-9	С	С
228th Street SE, east of Bothell-Everett Hwy (SR-527)	С	С
SR-9, north of SR-522 ^a	F	F
Route 9 Site – 228th Street Corridor		
SR-104, west of Interstate 5	F	F
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С
SR-99, south of SR-104	F	F
SR-99, north of SR-104	F	F
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F
Bothell Way NE (SR-522), west of Bothell-Everett Hwy (SR-527)	С	С
NE 195th Street, east of Interstate 405	E	E
228th Street SE, west of SR-9	С	С
228th Street SE, east of Bothell-Everett Hwy (SR-527)	С	С
SR-9, north of SR-522 ^a	F	F

^aDoes not include WSDOT SR-9 widening project

Table 56. Route 9 Site and Corridors – Estimated 2040 P.M. Peak-Hour Intersection Levels of Service During Operation

2040 N	o Action		peration mgd)
LOS	Delay ^a	LOS	Delay
F	127	F	127
F	118	F	118
F	168	F	168
F	401	F	401
F	335	F	335
F	82	Е	72
F	114	F	101
F	52	E	49
F	185	F	171
F	335	F	335
F	82	E	72
F	209	F	210
F	114	F	101
F	52	E	49
F	185	F	171
	F F F F F F F F F F F F F F F F F F F	F 127 F 118 F 168 F 401 F 335 F 82 F 114 F 52 F 185 F 82 F 114 F 52 F 185	LOS Delay ^a LOS F 127 F F 118 F F 168 F F 401 F F 335 F F 82 E F 114 F F 52 E F 82 E F 82 E F 209 F F 114 F F 52 E

^aDoes not include WSDOT SR-9 widening project

3.1.2 Route 9 Conveyance System—195th Street Corridor

Construction of the conveyance system would require access to portal locations along the selected conveyance corridor. Access routes to portal locations would generally follow existing interstates, state routes, and major arterials. These specific routes are identified and described in the following portal discussions. Impacts were evaluated for conveyance corridors during the peak construction period (2007). Impacts during the operations and maintenance phase would be minimal and are discussed qualitatively. Trip credits associated with the removal of existing or potential land uses at the portal sites were not assumed. Impacted areas are on average 2-acre sites for which displaced trips were assumed to be minimal.

In addition to generating construction truck traffic, all conveyance alternatives would involve some disturbance to existing traffic patterns during the construction period. In

densely developed areas, construction could restrict access to homes or businesses in the portal or pump station vicinity. For some portals on all system alternatives, existing roadways would require pedestrians and other non-motorized entities (e.g. bicyclists) to share the road with construction vehicles. King County would commit to mitigation measures to avoid or minimize these impacts. The portals would be located on properties adjacent to roadways. No changes to, or realignments of, public roadways are anticipated.

Access to most portal sites would require use of local and residential streets. These types of streets may be narrow; may not include formal walking areas for pedestrians; and may have intersections that require wide turns by larger vehicles. Section 2, Affected Environment, provides an inventory of the street systems that would be used for access to portals. Mitigation measures would be provided to support access to selected portal locations. These measures are identified in Section 4, Mitigation.

Portal 5 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing traffic volumes at the study intersections to estimate the 2007 background traffic volumes during construction. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, the Ballinger Way NE/15th Avenue NE intersection is expected to continue to operate at LOS E, below acceptable levels, under the future No Action Alternative.

Construction of the portal is expected to peak in 2008. The total construction duration is approximately 1.0 year. Peak construction activities for the entire Brightwater project are projected to occur during 2007. The peak truck traffic for this portal was added to the cumulative peak traffic of the entire project (2007) to provide the most conservative (worst-case) scenario. The peak construction activities for Portal 5 entail the number of trips summarized in Table 57.

Table 57. Route 9–195th Street Corridor, Portal 5 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips		
Earthwork Truck Trips	0	0		
Concrete Truck Trips	16	2		
Construction Worker Trips	78	39		
Misc. Vehicle/Materials Delivery	32	3		
Total Trips	104	44		

Source: URS, August 19, 2003

Note: Earthwork would be completed before peak construction occurs.

The above trips were overlaid on future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes. If this analysis were conducted with the 2008 background traffic, the results might be worse. Background traffic volumes would increase by the assumed regional

1 percent per-year growth rate; however, the overall project construction would be beyond the peak activity period.

The additional construction traffic is projected to increase delays at the study intersections slightly, as shown in Table 58. The LOSs for both intersections are projected to remain the same as the No Action Alternative.

Table 58. Route 9–195th Street Corridor, Portal 5 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site X		Sites B, G	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS
Ballinger Way NE (SR-104) at 15th Avenue NE	66	E	69	Е	69	Е
SR-104/I-5 SB Ramps	32	С	33	С	33	С

^aAverage delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

SR-104 and 15th Avenue NE within the construction route are characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected. On-street parking on 15th Avenue NE may be affected during construction activities.

Ballinger Terrace Shopping Center is located within the portal siting area off of Ballinger Way NE. A private elementary school is located southeast of the of the portal siting area, near Ballinger Way NE and 19th Avenue NE. Vehicular and non-motorized access to the shopping center and school may be affected.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes an air handling shaft below ground, an aboveground single-stage odor control building with electrical room, and a dechlorination facility. Operation and maintenance of these facilities would increase traffic in the vicinity of the structure by approximately two trips per week.

Maintenance checks would generally require a two- to four-man crew in a county truck.

Portal 11 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during construction. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis conducted for the study intersections, two of the study intersections are expected to operate at LOS F under the

future no-action scenario: Bothell Way NE/Bothell-Everett Highway and Bothell Way NE/68th Avenue NE. All of the other study intersections are projected to operate at LOS B or better during the afternoon peak hour.

Construction of the portal is expected to peak in 2007. The total construction duration is approximately 1.5 years. The peak construction activities for Portal 11 entail the number of trips summarized in Table 59.

Table 59. Route 9–195th Street Corridor, Portal 11 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips			
Earthwork Truck Trips	42	5			
Concrete Truck Trips	0	0			
Construction Worker Trips	88	44			
Misc. Vehicle/Materials Delivery	22	2			
Total Trips	152	51			

Source: URS, August 19, 2003

Additional construction activity to connect existing sewer lines to the conveyance tunnel would occur in the vicinity of Portal 11. These pipeline connections would be accomplished with short open-cut construction methods on land adjacent to and off of the existing roadway system. Occasionally, truck access would be accomplished with flaggers. When construction occurs at roadways, at least one lane in each direction would be maintained.

The above trips were overlaid on future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic would have minimal effects on the study intersections as shown in Table 60. All intersections would operate similarly to the No Action Alternative.

Table 60 shows predicted construction impacts in the event that the City of Kenmore's SR-522 multimodal corridor project Phase I is not completed prior to the peak Brightwater construction period. If Kenmore's project is completed, intersection conditions would improve as follows: The SR-522/68th NE intersection would operate at LOS E (58 s/v) under the No Action Alternative, LOS E (60 s/v) for portal sites A and B, and LOS E (62 s/v) for Portal site C. The 68th Avenue NE/NE 181st intersection would operate at LOS A/B for all alternatives.

Table 60. Route 9–195th Street Corridor, Portal 11 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site B		Site C	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
NE Bothell Way/68th Avenue NE	118	F	122	F	122	F	127	F
NE Bothell Way/Bothell Everett Highway	88	F	92	F	92	F	92	F
68th Avenue NE/NE 175th Street	17	В	17	В	17	В	17	В
68th Avenue NE/NE 181st Street (northern T)	9	Α	9	Α	9	Α	9	Α
68th Avenue NE/NE 181st Street (Rite-Aid)	13	В	13	В	13	В	13	В

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

SR-522 and 68th Avenue NE within the construction route are characterized by good pavement conditions and pedestrian amenities. The roadways should be able to physically accommodate construction vehicles and are not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected. On-street parking on 15th Avenue NE may be affected during construction activities.

NE 175th Street may experience adverse impacts to pavement from construction vehicle traffic. Additionally, it is not furnished with sidewalks and/or bike lanes, therefore, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles. On-street parking may also be affected during construction operations.

An existing Park-n-Ride lot is located near NE 182nd Street and 68th Avenue NE, north of the portal site. Also north of the portal site is City Hall, near NE 181st Street and 68th Avenue NE. Vehicular and non-motorized access to the Park-n-Ride and City Hall may be affected.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes a diversion structure below ground, a drop structure below ground, an aboveground dual-stage odor control building with electrical room, and expansion of the existing Kenmore Pump Station chemical injection facility. Operation and maintenance of these facilities would typically generate approximately two trips per week.

Maintenance checks would generally require a two- to four-man crew in a county truck.

Portal 19 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, the intersection of N 185th Street/SR-99 is expected to operate below acceptable roadway standards under the future No Action Alternative.

Construction of the portal is expected to peak in 2007. The total construction duration is approximately 3.5 years. The peak construction activities for Portal 19 entail the number of trips summarized in Table 61. To evaluate the cumulative impacts, the Zone 7S outfall construction trips were combined with the Portal 19 trips.

Table 61. Route 9–195th Street Corridor, Portal 19 – Estimated Peak Project Construction Trips

Site	Daily Trips	A.M. and P.M. Peak-Hour Trips
Earthwork Truck Trips	32 (78)	4 (10)
Concrete Truck Trips	0 (10)	0 (1)
Construction Worker Trips	92 (110)	46 (55)
Misc. Vehicle/Materials Delivery	18 (24)	2 (2)
Total Trips	142 (222)	52 (68)

Source: URS, August 19, 2003

Note: Numbers in parentheses (xx) represent trips for the Portal 19 construction and the adjacent Zone 7S outfall construction

The above trips, assuming both Portal 19 and Zone 7S outfall, were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic is projected to have a minimal effect on the study intersections during both the morning and afternoon peak hours. All of the intersections are projected to operate at similar levels to the No Action Alternative, as shown in Tables 62 and 63.

N 185th Street, NW Richmond Beach Road, and NW 195th Street within the construction route are characterized by good pavement conditions and pedestrian amenities. The roadways should be able to physically accommodate construction vehicles and are not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected

Table 62. Route 9–195th Street Corridor, Portal 19 – Estimated 2007 Intersection A.M. Peak-Hour Traffic During Construction

	No A	ction	Site) A	Site (prefe	-	Site E		
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	
N 185th Street/SR-99	64	Е	76	Е	76	Е	76	E	
NW Richmond Beach Road/8th Avenue NW	32	С	34	С	34	С	34	С	
Richmond Beach Drive/NW 196th Street	9	Α	9	Α	9	Α	9	Α	

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Table 63. Route 9–195th Street Corridor, Portal 19 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

					Site	C			
	No A	ction	Site	A	(prefe	rred)	Site E		
Intersection	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	
N 185th Street/SR-99	82	F	88	F	88	F	88	F	
NW Richmond Beach Road/8th Avenue NW	38	D	39	D	39	D	39	D	
Richmond Beach Drive/NW 196th Street	9	Α	10	Α	10	Α	10	Α	

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time, due to intersection controls.

SR-99 within the construction route is characterized by fair pavement conditions and may experience adverse impacts to pavement from construction vehicle traffic. Additionally, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles on SR-99, NW 196th Street, and Richmond Beach Drive NW, which have no specified pedestrian amenities.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes a transition structure and sampling station below ground. These facilities would be expected to generate approximately two trips per week in the vicinity of the structure to conduct measurement and routine inspections.

Maintenance checks would generally require a two- to four-person crew in a county truck.

Portal 41 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during construction. The growth is consistent with the PSRC regional model forecasts and

historical traffic growth. Based on the intersection analysis, two intersections—the NE 195th Street intersections with North Creek Parkway and 120th Avenue NE—are expected to operate at LOS E and F conditions, respectively, in 2007. This is below acceptable operating conditions as defined by the responsible jurisdiction.

Construction of the portal is expected to peak in 2007. The total construction duration is approximately 3.5 years. The peak construction activities for Portal 41 entail the number of trips summarized in Table 64.

Table 64. Route 9–195th Street Corridor, Portal 41 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	110 (116)	14 (15)
Concrete Truck Trips	80 (80)	8 (8)
Construction Worker Trips	144 (180)	72 (90)
Misc. Vehicle/Materials Delivery	58 (64)	6 (7)
Total Trips	392 (440)	100 (119)

Source: URS, August 19, 2003.

Note: Numbers in parentheses (xx) represent trips for the Portal 41 construction and the adjacent Microtunnel construction

The above trips, assuming both Portal 41 and the microtunnel, were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic would impact the study intersections as shown in Table 65. The LOSs of the study intersections are projected to remain similar to the No Action Alternative with the exception of the Beardslee Boulevard/Ross Road intersection, in the City of Bothell, which would operate at LOS F conditions in conjunction with site W. The NE 195th Street/North Creek Parkway intersection would also experience an LOS change from D to E with Site X.

Table 65. Route 9–195th Street Corridor, Portal 41 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No A	ction	Sites	A/J	Site	C	Site	Đ	Site	W	Site	e X
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 NB Ramp/NE 195th Street	36	D	41	D	41	D	41	D	37	D	41	D
I-405 SB Ramp/NE 195th Street	24	С	25	С	25	С	25	С	26	С	25	С
NE 195th Street/North Creek Parkway	51	D	52	D	52	D	52	D	51	D	66	Е
NE 195th Street/120th Avenue NE	91	F	91	F	111	F	97	F	91	F	91	F
Beardslee Blvd/Ross Road	21	С	21	С	21	С	21	С	416	F	21	С

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

NE 195th Street, 120th Avenue NE, and North Creek Parkway within the construction route are characterized by good pavement conditions and pedestrian amenities. The roadways should be able to physically accommodate construction vehicles and are not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

North Creek Sportsfields is located to the south of the portal siting area, between North Creek Parkway and 120th Avenue NE. Vehicular and non-motorized access to the sports fields may be affected.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes a diversion structure below ground, a drop structure below ground, an aboveground dual- or three-stage odor control building with electrical room, and a chemical injection facility. These facilities would increase traffic in the vicinity of the portal by approximately two trips per week for maintenance and inspection.

Maintenance checks would generally require a two- to four-man crew in a county truck.

Portal 44 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, one intersection—Bothell Way NE/Bothell-Everett Highway—is expected to operate at LOS F under the future no-action scenario. Additionally, the intersection of 80th Avenue NE and Bothell Way NE is projected to operate at LOS E. These are below the acceptable standards.

Construction of the portal and connection to the existing sewer line is expected to peak in 2007. The total construction duration is approximately 4.0 years. The peak construction activities for Portal 44 entail the number of trips summarized in Table 66.

These trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

Table 66. Route 9–195th Street Corridor, Portal 44 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	0	0
Concrete Truck Trips	92	9
Construction Worker Trips	92	46
Misc. Vehicle/Materials Delivery	20	2
Total Trips	204	57

Source: URS, August 19, 2003.

The additional construction traffic is projected to have minimal effects on the study intersections, as shown in Table 67, with the exception of 80th Avenue NE/NE 195th Street. Operations at this intersection are expected to decline to LOS E for two portal sites, which is still within acceptable levels as defined by the City of Kenmore.

Table 67. Route 9–195th Street Corridor, Portal 44 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site C		Site D		Site E	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
Route 9 Site - 228th Corridor								
NE Bothell Way/Bothell Everett Highway	88	F	92	F	92	F	92	F
80th Avenue NE/NE Bothell Way	59	Е	67	Е	67	Е	67	Е
80th Avenue NE/NE 195th Street	19	С	39	Е	39	Е	19	С

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

80th Avenue NE and NE 195th Street may experience adverse impacts to pavement from construction vehicle traffic. Additionally, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles. Pedestrians may also be impacted on SR-522, south of 96th Avenue NE. This area is characterized by narrow shoulders along the roadway.

Westhill Park is located to the east of the portal siting area, off of NE 195th Street. Vehicular and non-motorized access to the park may be affected.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes a drop structure below ground, and an aboveground dual or three-stage odor control building with electrical room. These facilities would increase traffic in the vicinity of the portal by approximately two trips per week for maintenance and inspection.

Maintenance checks would generally require a two- to four-person crew in a county truck.

Portal 7 (Secondary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, operating characteristics would remain similar to existing conditions. The Ballinger Way NE/15th Avenue NE intersection would continue to operate at LOS E, and the Ballinger Way NE/25th Avenue NE and SR-104/I-5 Southbound Ramps intersections are expected to remain at LOS C under the future No Action Alternative.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak-hour traffic operations.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic would have minimal effects on the study intersections as shown in Table 68. All intersections would operate similarly to the No Action Alternative.

Table 68. Route 9–195th Street, Portal 7 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site B		Site C	
Intersection	Delay ^a	LOS						
Ballinger Way NE/25th Avenue NE	31	С	31	С	31	С	31	С
Ballinger Way NE (SR-104) at 15th Avenue NE	66	Е	69	E	69	E	69	E
SR-104/I-5 SB Ramps	32	С	33	С	33	С	33	С

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These

checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 23 (Secondary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, the study intersection is expected to operate at LOS C under the future no-action scenario.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak hour traffic operations.

The above trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic would have minimal effects on the study intersection as shown in Table 69. It would operate similarly to the No Action Alternative.

Table 69. Route 9–195th Street Corridor, Portal 23 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site D		Site F	
Intersection	Delaya	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-104 and I-5 SB Ramps	32	С	33	С	33	С	33	С

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 27 (Secondary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the

construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, the study intersection is expected to operate acceptably at LOS C under the future No Action Alternative.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak hour traffic operations.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total construction traffic volumes. The study intersection is projected to operate at the same level as the No Action Alternative for all three alternative sites (Table 70).

Table 70. Route 9–195th Street Corridor, Portal 27 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Ac	No Action		Site A		В	Site C	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-104/I-5 SB Ramps	32	С	33	С	33	С	33	С

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 45 (Secondary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, all intersections are expected to operate at LOS E/F under the future No Action Alternative. These levels are unacceptable as defined by the responsible jurisdiction.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated

would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak hour traffic operations.

The above trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction related traffic from surrounding portals and/or treatment plant facilities were included in the total construction traffic volumes.

The additional construction traffic would have minimal effects on the study intersections as shown in Table 71. All intersections would operate similarly to the no-action scenario.

Table 71. Route 9–195th Street Corridor, Portal 45 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No A	No Action		Site A		C	Site D	
Intersection	Delaya	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
NE Bothell Way and Bothell-Everett Highway	88	F	92	F	92	F	92	F
NE Bothell Way and 80th Avenue NE	59	Е	67	Е	67	Е	67	Е
NE Bothell Way and 68th Avenue NE	118	F	122	F	122	F	122	F

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Influent Pump Station (IPS) Option

Construction Impacts

Construction of the IPS at Portal 41 would occur over a 2-year period, with peak construction activities occurring in the first 18 months, producing an average of 28 daily truck trips. The number of truck trips would gradually decline over the last 6 months of the 2-year construction period as activities shift from excavation and concrete wall construction to finishing and landscape work. The estimated construction activity would be in addition to the Portal 41 construction trips. Other construction-related transportation impacts, such as access and pedestrian circulation, are similar to those described for portal construction. Ingress and egress of construction vehicles at the pump station site would result in increased delays in circulation in the vicinity of the work site.

If the IPS is constructed at the Portal 41 location, the construction activities at the Route 9 Treatment Plant Site would be reduced by the amount described above.

Operational Impacts

Traffic trips for IPS operation would include four to eight chemical truck trips per month with all occurring during non-peak hours, four operations vehicle trips per day with two occurring during peak hours, four maintenance vehicle trips per day with all occurring

during non-peak hours, and four to eight maintenance truck trips per month most likely occurring during non-peak hours. These trips are not expected to contribute significantly to overall traffic volumes. No transportation-related impacts would result with the operation of the IPS at Portal 41.

3.1.3 Route 9 Conveyance System—228th Street Corridor

Construction of the conveyance system would require access to portal locations along the selected conveyance corridor. Access routes to portal and pump station locations would generally follow existing interstates, state routes, and major arterials. These specific routes are identified and described in the following portal discussions. Impacts were evaluated for conveyance corridors during the peak construction period (2007). Impacts during the operations and maintenance phase would be minimal and are discussed qualitatively. Trip credits associated with the removal of existing or potential land uses at the portal sites were not assumed. Impacted areas, on average, are 2-acre sites for which displaced trips were assumed to be minimal.

In addition to generating construction truck traffic, all conveyance alternatives would involve some disturbance to existing traffic patterns during the construction period. In densely developed areas, construction could restrict access to homes or businesses in the portal or pump station vicinity. For some portals on all system alternatives, existing roadways would require pedestrians and other non-motorized entities (e.g., bicyclists) to share the road with construction vehicles. King County would commit to mitigation measures to avoid or minimize these impacts. The portals would be located on properties adjacent to roadways. No changes to, or realignments of, public roadways are anticipated.

Access to most portal sites would require use of local and residential streets. These types of streets may be narrow; may not include formal walking areas for pedestrians; and may have intersections that require wide turns by larger vehicles. Section 2, Affected Environment, provides an inventory of the street systems that would be used for access to portals. Mitigation measures would be provided to support access to selected portal locations. These measures are identified in Section 4, Mitigation.

Portal 11 (Primary)

Portal 11 is common to both the 195th Street and 228th Street corridors and is described in section 3.1.2 above. However, the number of trips is slightly different in this alternative and is shown in Table 72. Impacts on the study intersections are shown in Table 73.

Table 72. Route 9–228th Street Corridor, Portal 11 — Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	42	5
Concrete Truck Trips	0	0
Construction Worker Trips	92	46
Misc. Vehicle/Materials Delivery	22	2
Total Trips	156	53

Source: URS, August 19, 2003.

Table 73. Route 9–228th Street Corridor, Portal 11 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site B		Site C	
Intersection	Delay ^a	LOS						
NE Bothell Way/68th Avenue NE	118	F	122	F	122	F	127	F
NE Bothell Way/Bothell Everett Highway	88	F	92	F	92	F	92	F
68th Avenue NE/NE 175th Street	17	В	17	В	17	В	17	В
68th Avenue NE/NE 181st Street (northern T)	9	Α	9	Α	9	Α	9	Α
68th Avenue NE/NE 181st Street (Rite-Aid)	13	В	13	В	13	В	14	В

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 44 (Primary)

Portal 44 is common to both the 195th Street and 228th Street corridors and is described in section 3.1.2 above. However, the number of trips is different in this alternative and is shown in Table 74. Impacts on the study intersections are shown in Table 75.

Table 74. Route 9–228th Street Corridor, Portal 44 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	42	5
Concrete Truck Trips	0	0
Construction Worker Trips	92	46
Misc. Vehicle/Materials Delivery	22	2
Total Trips	156	53

Source: URS, August 19, 2003.

Table 75. Route 9–228th Street Corridor, Portal 44 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site C		Site D		Site E	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
NE Bothell Way/Bothell Everett Highway	88	F	92	F	92	F	92	F
80th Avenue NE/NE Bothell Way	59	Ε	67	Ε	67	Ε	67	Е
80th Avenue NE/NE 195th Street	19	С	38	Ε	38	Ε	19	С

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 41 (Primary)

Construction Impacts

Portal 41 is common to both the 195th Street and 228th Street corridors and is described in section 3.1.2 above. However, the number of trips is different in this alternative and is shown in Table 76. Impacts on the study intersections are shown in Table 77.

Table 76. Route 9–228th Street Corridor, Portal 41 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	42	5
Concrete Truck Trips	0	0
Construction Worker Trips	92	46
Misc. Vehicle/Materials Delivery	22	2
Total Trips	156	53

Source: URS, August 19, 2003.

Table 77. Route 9–228th Street Corridor, Portal 41 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No A	ction	Sites	A/J	Site	C	Site	D	Site	W	Site	X
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 NB Ramp/NE 195th Street	36	D	37	D	37	D	37	D	36	D	37	D
I-405 SB Ramp/NE 195th Street	24	С	25	С	25	С	25	С	24	С	25	С
NE 195th Street/North Creek Parkway	51	D	51	D	51	D	51	D	51	D	57	Е
NE 195th Street/120th Avenue NE	91	F	91	F	99	F	92	F	91	F	91	F
Beardslee Blvd/Ross Road	21	С	21	С	21	С	21	С	114	F	21	С

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 39 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the study intersection's existing traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, all intersections are expected to operate at LOS E or better under the future No Action Alternative. The 228th Street SW/SR-527 intersection, which is projected to operate at LOS E, would fall below the acceptable roadway standards of the roadway's jurisdiction.

Construction of the portal is expected to peak in 2007. The total construction duration is approximately 3.0 years. The peak construction activities for Portal 39 entail the number of trips summarized in Table 78.

Table 78. Route 9–228th Street Corridor, Portal 39 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	42	5
Concrete Truck Trips	0	0
Construction Worker Trips	92	46
Misc. Vehicle/Materials Delivery	22	2
Total Trips	156	53

Source: URS, August 19, 2003.

The above trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic is projected to have minimal effects on the study intersections as shown in Table 79.

Table 79. Route 9–228th Street Corridor, Portal 39 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Ad	No Action		Site B		Site C		D
Intersection	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 NB Ramp/SR-527	46	D	46	D	46	D	46	D
I-405 SB Ramp/SR-527	24	С	24	С	24	С	24	С
228th Street SW/SR-527	58	Е	64	Е	64	Е	64	E

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

SR-527 within the construction route is characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other

physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

Portions of 228th Street SW may experience adverse impacts to pedestrians and non-motorized vehicles where existing facilities are not available, and they may be required to share the roadway with construction vehicles.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribution significantly to overall traffic volumes in the vicinity.

Portal 33 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, all intersections are expected to operate at LOS E or better under the future No Action Alternative. The 228th Street SW/SR-527 intersection, which is projected to operate at LOS E, would fall below the acceptable roadway standards of the roadway's jurisdiction.

Construction of the portal is expected to peak in 2007. The total construction duration is approximately 3.5 years. The peak construction activities for Portal 33 entail the number of trips summarized in Table 80.

Table 80. Route 9–228th Street Corridor, Portal 33 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	32	4
Concrete Truck Trips	0	0
Construction Worker Trips	92	46
Misc. Vehicle/Materials Delivery	18	2
Total Trips	142	52

Source: URS, August 19, 2003.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic is projected to have a minimal effect on the study intersections as shown in Table 81.

Table 81. Route 9–228th Street Corridor, Portal 33 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site C		Site D	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 NB Ramp/SR-527	46	D	46	D	46	D	46	D
I-405 SB Ramp/SR-527	24	С	24	С	24	С	24	С
228th Street SW/SR-527	58	Е	64	Е	64	Е	64	Е
228th Street SW/14th Avenue West	16	В	18	В	18	В	18	В
228th Street SW/Locust Way	12	В	12	В	12	В	12	В

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

SR-527 within the construction route is characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

Locust Way may experience adverse impacts to pavement from construction vehicle traffic. Additionally, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles.

Portions of 228th Street SW may experience adverse impacts to pedestrians and non-motorized vehicles where existing facilities are not available, and they may be required to share the roadway with construction vehicles.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 26 (Primary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, all intersections are expected to operate at LOS D or better under the future no-action scenario.

Construction of the portal is expected to peak in 2007. The total construction duration is approximately 1.0 year. The peak construction activities for Portal 26 entail the number of trips summarized in Table 82.

Table 82. Route 9–228th Street Corridor, Portal 26 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	36	5
Concrete Truck Trips	0	0
Construction Worker Trips	28	14
Misc. Vehicle/Materials Delivery	6	21
Total Trips	70	19

Source: URS, August 19, 2003.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total construction traffic volumes.

The additional construction traffic is projected to have minimal effects on the study intersection operations as shown in Table 83.

Portions of 73rd Avenue W, 224th Street SW, and 228th Street SW along the construction route may experience adverse impacts to pedestrians and non-motorized vehicles where existing facilities are not available, and they may be required to share the roadway with construction vehicles. On-street parking may also be affected by construction operations.

Ballinger Park is located to the south of the portal siting area along Lakeview Drive.

Table 83. Route 9–228th Street Corridor, Portal 26 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site C		Site D	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
224th Street SW/SR-99	36	D	36	D	36	D	36	D
224th Street SW/73rd Avenue West	11	В	11	В	11	В	11	В
228th Street SW/73rd Avenue West	14	В	15	С	14	В	15	С

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes an air handling shaft below ground, an aboveground single-stage odor control building with electrical room, and a dechlorination facility.

These facilities would increase traffic in the vicinity of the structure by approximately two trips per week to perform facility inspections.

Maintenance checks would generally require a two- to four-man crew in a county truck.

Portal 19 (Primary)

Portal 19 is common to both the 195th Street and 228th Street corridors and is described in section 3.1.2 above. However, the number of trips is different in this alternative and is shown in Table 84. The impacts are also different as shown in Tables 85 and 86.

Table 84. Route 9–228th Street Corridor, Portal 19 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	32 (78)	4 (10)
Concrete Truck Trips	0 (10)	0 (1)
Construction Worker Trips	92 (110)	46 (55)
Misc. Vehicle/Materials Delivery	18 (24)	2 (2)
Total Trips	142 (222)	52 (68)

Source: URS, August 19, 2003.

Note: Numbers in parentheses (xx) represent trips for the Portal 19 construction and the adjacent

Zone 7S outfall construction

Table 85. Route 9–228th Street Corridor, Portal 19 – Estimated 2007 Intersection A.M. Peak-Hour Traffic During Construction

	No Action		on Site A		Site C		Site E	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
N 185th Street/SR-99	64	Е	76	Е	76	Ε	76	Е
NW Richmond Beach Road/8th Avenue NW	32	С	34	С	34	С	34	С
Richmond Beach Drive/NW 196th Street	9	Α	9	Α	9	Α	9	Α

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Table 86. Route 9–228th Street Corridor, Portal 19 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site	A	Site C		Site E	
Intersection	Delaya	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
N 185th Street/SR-99	82	F	88	F	88	F	88	F
NW Richmond Beach Road/8th Avenue NW	38	D	39	D	39	D	39	D
Richmond Beach Drive/NW 196th Street	9	Α	10	Α	10	Α	10	Α

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time, due to intersection controls.

Portal 37 (Secondary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, all of the study intersections are expected to operate at acceptable conditions, LOS E or better, under the future No Action Alternative. The 228th Street SE/SR-527 intersection would operate below acceptable standards for its jurisdiction.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak hour traffic operations.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes

The additional construction traffic would have minimal effects on the study intersections as shown in Table 87. All intersections would operate similarly to the no-action scenario.

Table 87. Route 9–228th Street Corridor, Portal 37 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site	A	Site	C	Site D	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
I-405 NB Ramp/SR-527	46	D	46	D	46	D	46	D
I-405 SB Ramp/SR-527	24	С	24	С	24	С	24	С
228th Street SW/SR-527	58	Е	64	Е	64	Е	64	E

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 30 (Secondary)

Construction Impacts

Portal 30 is a secondary portal for the 228th Street corridor alternative. It would have minimal construction impacts because there is no primary portal-related or treatment plant site-related construction traffic passing through its siting area.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 24 (Secondary)

Construction Impacts

Portal 24 would have minimal construction impacts because there is no primary portal-related or site-related construction traffic passing through its siting area.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 22 (Secondary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, the SR-104/I-5 Southbound Ramps intersection is expected to operate acceptably at LOS C under the future No Action Alternative.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak-hour traffic operations.

The above trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction related traffic from surrounding portals and/or treatment plant facilities was included in the total construction traffic volumes.

The additional construction traffic would have minimal effects on the study intersection as shown in Table 88. The study intersection would operate similarly to the No Action Alternative.

Table 88. Route 9–228th Street Corridor, Portal 22 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Ac	Site	e A	Site C, D, E, F		
Intersection	Delay	LOS	Delay	LOS	Delay ^a	LOS
SR-104/I-5 SB Ramps	32	С	33	С	34	С

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Influent Pump Station (IPS) Option

Construction Impacts

The impacts associated with the Route 9-228th Street corridor IPS Option are the same as those described for the Route 9-195th Street corridor IPS Option above, although due to the slight difference in the depth of the alignment and corresponding reduction in the volume of earthwork for the construction of the IPS at Portal 41, there will be a slight reduction in the number of truck trips required for construction of the IPS at Portal 41 under the Route 9-228th Street alternative.

Operational Impacts

Traffic trips for IPS operation would include four to eight chemical truck trips per month with all occurring during non-peak hours, four operations vehicle trips per day with two occurring during peak hours, four maintenance vehicle trips per day with all occurring during non-peak hours, and four to eight maintenance truck trips per month most likely occurring during non-peak hours. These trips are not expected to contribute significantly to overall traffic volumes. No transportation-related impacts would result with the operation of the IPS at Portal 41.

3.2 Unocal Site

3.2.1 Unocal Treatment Plant

Construction Impacts

Transportation System

As part of the construction effort, Pine Street would need to be realigned to maintain access to the Town of Woodway and Edmonds during and after construction on the Unocal site. The street would be realigned to the south along the Unocal property line and

would continue west from the intersection of SR-104 without the current bend to the north. Retaining walls would be constructed to stabilize the slope after excavation. The roadway section and grade requirements would be constructed to county and city roadway design standards, and construction would take approximately four to six months to complete. During construction, construction vehicles would occasionally travel with neighborhood traffic to access the construction area. Flaggers would be onsite to assist all site access and minimize conflicts and traffic delays.

Access to Woodway and Edmonds and access for emergency vehicles would be maintained at all times during construction of this new roadway segment. After completion of the newly realigned Pine Street, local neighborhood traffic would be rerouted permanently to the new roadway. The realignment is not expected to cause any changes in intersection operating LOSs along Pine Street or long delays during peak traffic conditions.

Construction Traffic Impact Analysis (2007)

Construction of the initial 36-mgd treatment plant and corridor would be completed over approximately 4 to 6 years, with a completion date of 2010. Heavy construction at the treatment plant site, such as major earthwork excavation and concrete placement for construction of tanks and structures, would occur in the first 2 to 3 years; thus, the greatest impacts would occur during this time. During 2007, which represents the peak construction period, traffic along the site access route would increase by nearly 690 daily truck trips (one way). Approximately 123 of these daily trips would occur during the afternoon peak hours. Additional traffic associated with the treatment plant portal and Zone 6 Outfall construction would also be added to the roadway network. The cumulative peak construction activities are characterized by the construction trips as shown in Table 87. The cumulative trips would increase the peak hour traffic by approximately 19.

This peak construction traffic was assumed to occur at the same time as the afternoon peak period of the surrounding roadway network system and was used for the traffic operating LOS analysis to assess the worst-case traffic conditions.

Table 89 provides a breakdown of estimated construction trips. Figure 41 illustrates the 2007 background and construction traffic volumes and routes of access to the Unocal treatment plant site.

Potential impacts on the area transportation system would be related mainly to increased traffic volumes associated with earthwork and material delivery. (See Attachment A, Unocal Site Remote Truck Staging Area). Adequate space for construction worker parking is not expected to be available at or near the Unocal site. It is assumed that, as a mitigation measure, shuttle buses would transport workers to the site from a remote parking location.

Table 89. Unocal Site -- Estimated Project Construction Trips^a

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	486 (582)	61 (73)
Concrete Truck Trips	28 (36)	3 (4)
Material/Equipment Truck Trips	14 (42)	1 (4)
Construction Worker Bus Trips ^b	27 (33)	13 (16)
Field Staff	135 (135)	45 (45)
Total Trips to/from the Unocal Site	690 (828)	123 (142)

Each trip represents one direction (inbound or outbound) of a round trip.

Note: Numbers in parentheses (xx) represent trips for the Unocal Treatment Plant, Zone 6 Outfall and the Plant Portal

Tables 90 and 91 show construction impacts for intersections and roadway segments, respectively.

Table 90. Unocal Site and Corridor – Estimated Intersection P.M. Peak-Hour Traffic During Construction and Operation^b

Intersection	2007 N	o Action		007 ruction	2010 N	o Action	2010 Operation (36-mgd)		
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	
Edmonds Way (SR-104) at Dayton Street	В	15	В	15	В	16	В	16	
Edmonds Way (SR-104) at Pine Street (unsignalized)	С	17	С	17	С	18	С	18	
Edmonds Way (SR-104) at 100th Avenue W	E	60	F	86	E	66	Е	67	
Aurora Avenue (SR-99) at 244th Street SW	E	58	Е	59	E	63	Е	63	
SR-104 at I-5 Southbound Off- Ramp	С	32	D	44	D	36	D	37	
Ballinger Way NE (SR-104) at 15th Avenue NE	E	66	Е	75	E	73	Е	73	
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	F	212	F	212	F	229	F	229	
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	F	88	F	89	F	105	F	105	
Bothell Way NE (SR-522) at	F	88	F	89	F	105	-	105	

^aAverage delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

^bAnalyses represent cumulative impacts of plant, outfall and portal construction.

October 2003 118

Estimated 468/234 (574/287) trips to remote parking (daily/peak hour) from regional transportation system. These trips do not reach the Unocal site.

Table 91. Unocal Site and Corridor – Estimated P.M. Peak-Hour Traffic for Roadway Segments During Construction and Operation

		2007 Constructi Site ^a			
	2007 No Action	Offsite parking parcels #1 & #2	Offsite parking parcel #3	2010 No Action	2010 Operation (36-mgd)
Intersection	LOS	LOS	LOS	LOS	LOS
Edmonds Way (SR-104), north of Pine Street	В	В	В	В	В
Edmonds Way (SR-104), north of 100th Avenue W	С	С	С	С	С
Edmonds Way (SR-104), north of SR-99	В	В	В	В	В
SR-104, west of Interstate 5	Е	F	F	F	F
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С	С	С	С
SR-99, south of SR-104	D	D	D	D	D
SR-99, north of SR-104	С	С	С	С	С
Bothell Way NE (SR-522), east of Ballinger Way NE (SR-104)	F	F	F	F	F
Bothell Way NE (SR-522), west of Bothell-Everett Hwy (SR-527)	С	С	С	С	С
NE 195th Street, east of Interstate 405	E	E	E	E	E

The segment traffic operation analysis results listed in Table 91 represent the impacts of the treatment plant and conveyance construction and 2010 operations. The table shows the differences for the three potential offsite parking areas; two of the candidate sites (Parcels P1 and P2) are within the vicinity of the I-5/SR-104 Interchange. Access to both of these sites would be via 60th Avenue West/Gateway Place. The third site (P3) is located along 236th Street SW near SR-99. A more detailed discussion of the offsite parking analyses is contained in Attachment B, Unocal Offsite Construction Employee Parking Lots Impact Analyses.

Although the number of trips generated by construction would be substantial, the effect on traffic operations and LOS is dependent on overall background traffic in the system. Under the worst-case scenario, additional trips associated with the most intense site construction activity represent approximately a 4 percent increase in peak-hour and daily traffic along SR-104 west of SR-99. Table 90 shows future conditions with and without the project. Intersection LOS is projected to change slightly from baseline conditions. Two intersections would experience drops in LOS. SR-104/100th Avenue W would change from LOS E to F during construction activities; and SR-104/I-5 Southbound Ramps would change from LOS C to LOS D.

In addition to these traffic impacts, access by pedestrians and bicyclists may occasionally be impeded by construction-related traffic. A higher number of accidents could potentially occur as a result of the increased traffic within the study area due to

construction activities. However, this relates to the potential exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

Unocal Structural Lid Sub-Alternative

A structural lid sub-alternative was considered to account for the total construction traffic of the Unocal treatment plant with a structural lid that would be the foundation for the proposed Edmonds Crossing multimodal transportation facility. The traffic analysis for the treatment plant with the structural lid has been conducted for the peak construction year of 2007. The traffic estimates include construction of the plant and the lid that would support the Edmonds Crossing multimodal terminal.

The total estimated daily construction trips, during the peak construction period, to the Unocal site with construction of a structural lid were slightly lower than without the lid. With the lid, approximately 742 daily (145 p.m. peak-hour) trips to the Unocal site were estimated during peak construction activities. In comparison to peak construction activity without the lid, earthwork trucks would decrease by approximately half, while the concrete, material, field staff, and shuttle bus trips would increase. Intersection and roadway operations are estimated to be similar without the lid.

Trips to the offsite parking facility are estimated to increase significantly with construction of the lid. Approximately 1,254 (627 p.m. peak-hour) daily construction worker trips are projected. The increase in construction workers would require that at least two candidate parcels be used together for remote worker parking. As a result, the intersection and roadway impacts would be greater surrounding the candidate parcel sites for the parking facilities. Intersection LOS would likely decline in the direct vicinity of the remote parking facilities.

Effect of Concurrent Construction (Edmonds Crossing)

The effect of concurrent construction of the Unocal treatment plant and the proposed Edmonds Crossing multimodal transportation facility was also considered. The traffic analysis includes construction of the plant, the structural lid that would support the Edmonds Crossing facility, and the traffic relating to construction of the terminal facilities.

Peak construction of Edmonds Crossing would generate an additional 341 daily (138 p.m. peak-hour) trips to the Unocal site. Approximately 250 daily (125 p.m. peak hour) trips would be associated with construction worker vehicles.

Table 92 depicts an estimate of traffic operations during construction of the treatment plant with structural lid and during concurrent construction of Edmonds Crossing. Delays are projected to increase slightly at the study intersections; however LOS levels are projected to remain the same as with the treatment-plant-with-lid-construction-only scenario. Segment LOS is also projected to remain the same.

Table 92. Unocal Site and Corridor – Estimated Intersection P.M. Peak-Hour Traffic with Concurrent Edmonds Crossing Construction^b

Intersection	2007 N	o Action	2007 Treatment Plant and Structural Lid Construction Construction Edmonds Cro			ctural Lid
	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
Edmonds Way (SR-104) at Dayton Street	В	15	В	15	В	19
Edmonds Way (SR-104) at Pine Street (unsignalized)	С	17	С	17	С	19
Edmonds Way (SR-104) at 100th Avenue W	E	60	F	86	F	102
Aurora Avenue (SR-99) at 244th Street SW	E	58	E	59	Е	59
SR-104 at I-5 Southbound Off- Ramp	С	32	D	44	D	48
Ballinger Way NE (SR-104) at 15th Avenue NE	Е	66	E	75	Е	75
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	F	212	F	212	F	212
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	F	88	F	89	F	89

^aAverage delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

As with the Route 9 alternative, different stages of project output were evaluated for the Unocal treatment plant site – 36 mgd and 54-mgd. The 36-mgd level represents operation and maintenance conditions by 2010, while the 54-mgd represents conditions in 2040. Two sub-alternatives relating to the Unocal site have also been evaluated. One involves treating flows from the Cities of Edmonds and Lynnwood, expanding the capacity of the plant to 72 mgd by 2040. The other involves building a structural lid over a portion of the plant site to accommodate the proposed multimodal transportation facility (Edmonds Crossing). The lid alternative could be incorporated into the design and construction of either the 54-mgd or the 72-mgd sub-alternative; however, for purposes of this evaluation, the 54-mgd plant was evaluated with the multimodal facility.

Each trip represents one direction of a round trip, inbound or outbound. The 36-mgd facility would generate 140 total trips per day, including 120 employee trips, 6 biosolids/grit truck trips, 4 chemical truck trips, and approximately 10 visitor trips. For worst-case analysis, afternoon peak-hour trips would total 44, with 2 of those being truck trips. By 2040, at 54 mgd, daily trip generation would total 206, with 60 trips occurring in the afternoon peak hours. In the 72-mgd scenario, daily trip generation would total 262, with 82 occurring during the afternoon peak. Table 93 lists traffic volumes generated by the treatment plant under both 2010 and 2040 conditions.

^bAnalyses represent cumulative impacts of plant, outfall and portal construction.

Table 93. Unocal Site Treatment Plant—Estimated Generated Traffic Trips^a During Operation

	36 mgd (2010)		54 m	ngd (2040)	72 mgd (2040)	
Trip/Vehicle Type	Daily	P.M. Peak Hour	Daily	P.M. Peak Hour	Daily	P.M. Peak Hour
Employee Trips/ Passenger Cars	120	40	180	55	230	75
Biosolids/Grit Truck Trips	6	1	8	2	10	2
Chemical Truck Trips	4	1	6	1	8	2
Visitors/Passenger Trips	10	2	12	2	14	3
Total	140	44	206	60	262	82

^a Each trip represents one direction (inbound or outbound) of a round trip. Source: Revised Brightwater Siting Project Phase 3 Technical Evaluation (April 2003)

The number of employees at the treatment plant would range from 50 (36 mgd) to 100 (72 mgd). Two work shifts are projected, with the maximum number of employees during the day shift at 39 to 65 people, including process, administration, and maintenance personnel.

The Unocal site shall provide parking internally to accommodate its parking needs as follows:

- Administration building 50 stalls
- Maintenance building 20 stalls
- Solids handling 10 stalls

2010 Operations

Few potential operational impacts are anticipated for the Unocal treatment plant site. The project would result in a minimal increase as a percentage of the total traffic along the routes used to access the site. Table 90 shows future conditions with and without the project. Intersection LOS is projected to generally remain the same as the no-action alternative. The Edmonds Way at 100th Avenue W intersection would decline to an LOS F level during peak construction activities.

All study-area roadway segment LOS (Table 91) would remain the same as in the No Action Alternative. Traffic conditions associated with operation at the Unocal site are presented in Figures 42 through 45.

The project would have minimal truck and vehicular trips associated with the operations phase. Thus impacts on ferry, freight, transit, bicycle and pedestrian traffic and accidents would be minor.

2040 Operations

Based on PSRC forecasts, traffic in the Puget Sound region will continue to grow at an average annual rate of 1 percent into 2040. By 2040, the increased capacity of the treatment plant would require higher staffing. Treatment plant-related traffic would be an estimated 206 daily one-way vehicle trips, including 8 biosolids/grit and 6 chemical truck

trips. Sixty of the daily trips are estimated to occur during the afternoon peak period. The analysis indicates that roadway segment LOS would not change as compared to the No Action Alternative. Under 2040 conditions (illustrated in Figure 43), however, background levels of service would reach unacceptable levels as defined by the responsible jurisdiction (LOS F) for many of the study segments and intersections along access routes, as shown in Tables 94 and 95.

The project would have minimal truck and vehicular trips associated with the operations phase. Thus impacts on ferry, freight, transit, bicycle, and pedestrian traffic and accidents would be minor.

Unocal 72-mgd Sub Alternative

If the plant were expanded to 72 mgd to accommodate Lynnwood and Edmonds flows, this expansion would be built near the end of the planning period. Environmental review would be done separately if the cities chose to be serviced by the facility; hence, this subalternative was evaluated only for 2040 operational conditions.

The Brightwater plant and outfall would need to be constructed to convey and discharge the full potential flows (72 mgd). Additional pipelines to convey the flows from Edmonds and Lynnwood to the Brightwater plant would also be required. The construction impacts of these new facilities would be evaluated near the term for implementation.

The project would have minimal truck and vehicular trips associated with the operations phase. Thus impacts on ferry, freight, transit, bicycle, and pedestrian traffic and accidents would be minor.

Unocal (54 mgd) Structural Lid Sub-Alternative with Edmonds Crossing

Combined impacts are described for the Unocal site because of the potential for partnership with a multimodal transportation facility.

The evaluation of impacts considered the combined effects of the Brightwater Treatment Plant and the proposed Edmonds Crossing multimodal transportation facility (Bernstein and WSA, 1995). Edmonds Crossing would be expected to increase traffic by 50 percent as compared to the existing ferry terminal. It would include a ferry access roadway system, holding lanes, ferry passenger parking, tollbooths, and areas for bus and commuter rail transit access that are under consideration for this site by the City of Edmonds, Sound Transit, and Washington State Ferries. Tables 94 and 95 summarize impacts with operation of both the Brightwater and Edmonds Crossing facilities.

Major impacts to intersection afternoon peak-hour LOS could occur with the combined impacts of treatment plant and multimodal facility traffic. Several intersections could experience significant increases in delay and degradation of LOS. Impacts include a drop in LOS at the intersection of Edmonds Way and Dayton Street: from LOS D in the nobuild condition to LOS F with the impacts of both the treatment plant and multimodal facility traffic. Estimated traffic conditions are summarized in Table 94 for segment LOS and Table 95 for intersection traffic operation LOS during the 2040 afternoon peak-hour traffic.

Table 94. Unocal Site -- Estimated 2040 P.M. Peak-Hour Roadway Segment Levels of Service During Operation

Roadway Segment	No Action	54- mgd	72-mgd Sub- Alternative	Cumulative 54 mgd with Edmonds Multimodal Project, Including Structural Lid
Edmonds Way (SR-104), north of Pine Street	В	В	В	В
Edmonds Way (SR-104), north of 100th Avenue W	Е	Е	Е	E
Edmonds Way (SR-104), north of SR-99	В	В	В	В
SR-104, west of Interstate 5	F	F	F	F
Ballinger Way NE (SR-104), south of 15th Avenue NE	С	С	С	С
SR-99, south of SR-104	F	F	F	F
SR-99, north of SR-104	F	F	F	F
Ballinger Way NE (SR-104) at 15th Avenue NE	F	F	F	F
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	С	С	С	С
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	Е	Е	Е	E

Table 95. Unocal Site -- Estimated 2040 P.M. Peak-Hour Intersection Levels of Service During Operation

	No	Action	54	-mgd	72-mgd Sub- Alternative		Cumulative 54 mgd with Edmonds Multimodal Project, Including Structural Lid	
Intersection	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a
Edmonds Way (SR-104) at Dayton Street	D	53	D	54	D	54	F	98
Edmonds Way (SR-104) at Pine Street (signalized for Edmonds Crossing alternative only)	D	29	D	28	D	28	С	34
Edmonds Way (SR-104) at 100th Avenue W	F	143	F	149	F	150	F	325
Aurora Avenue (SR-99) at 244th Street SW	F	127	F	127	F	127	F	137
SR-104 at I-5 Southbound Off-Ramp	F	118	F	120	F	120	F	161
Ballinger Way NE (SR-104) at 15th Avenue NE	F	168	F	168	F	174	F	176
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	F	401	F	401	F	401	F	401
Bothell Way NE (SR-522) at Bothell- Everett Hwy (SR-527)	F	335	F	335	F	335	F	335

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

3.2.2 Unocal Conveyance System

Construction of the conveyance system would require access to portal locations along the selected conveyance corridor. Access routes to portal and pump station locations would generally follow existing interstates, state routes, and major arterials. These specific routes are identified and described in the following portal discussions. Impacts were evaluated for conveyance corridors during the peak construction period (2007). Impacts during the operations and maintenance phase would be minimal and are discussed qualitatively. Trip credits associated with the removal of existing or potential land uses at the portal sites were not assumed. Impacted areas, on average, are 2-acre sites for which displaced trips were assumed to be minimal.

In addition to generating construction truck traffic, all conveyance alternatives would involve some disturbance to existing traffic patterns during the construction period. In densely developed areas, construction could restrict access to homes or businesses in the portal or pump station vicinity. For some portals on all system alternatives, existing roadways would require pedestrians and other non-motorized entities (e.g. bicyclists) to share the road with construction vehicles. King County would commit to mitigation measures to avoid or minimize these impacts. The portals would be located on properties adjacent to roadways. No changes to, or realignments of, public roadways are anticipated.

Access to most portal sites would require use of local and residential streets. These types of streets may be narrow; may not include formal walking areas for pedestrians; and may have intersections that require wide turns by larger vehicles. Section 2, Affected Environment, provides an inventory of the street systems that would be used for access to portals. Mitigation measures would be provided to support access to selected portal locations. These measures are identified in Section 4, Mitigation.

Portal 14 (Primary)

Additional construction activity to connect existing sewer lines to the Unocal conveyance tunnel would occur in the vicinity of Portal 14. These pipeline connections would be accomplished with short open-cut or microtunneling construction methods on land adjacent to and off of the existing roadway system. Occasionally, truck access would be accomplished with flaggers. When construction occurs at roadways, at least one lane in each direction would be maintained. At Portal 14, the connection route would follow North Creek Parkway South. Another construction option to make this connection would be by microtunneling, whereby no effects on roadways would occur except at microtunnel pit locations.

Construction

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, two of the study intersections are expected to operate below acceptable levels, as defined by the responsible jurisdiction, under the future No Action Alternative. The 132nd Avenue NE/NE 180th Street intersection would continue to operate at LOS F levels, and the NE 195th Street/North Creek Parkway intersection would decline to an LOS E condition. With the

signalization project at the intersection of NE 180th Street and 132nd Avenue NE, that intersection would operate at LOS C.

Construction of the portal is expected to peak in 2007. The construction duration is approximately 1.0 years. The peak construction activities for Portal 14 are characterized by the number of construction trips shown in Table 96.

Table 96. Unocal Corridor, Portal 14 -- Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	56	7
Concrete Truck Trips	0	0
Construction Worker Trips	92	46
Misc. Vehicle/Materials Delivery	22	2
Total Trips	170	55

Source: URS, August 19, 2003.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic is projected to have a minimal effect on all of the intersections as shown in Table 97.

Table 97. Unocal Corridor, Portal 14 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site	A	Site	В	Site	Site D	
Intersection	Delay ^a	LOS							
I-405 NB Ramp/NE 195th Street	36	D	38	D	38	D	38	D	
I-405 SB Ramp/NE 195th Street	24	С	25	С	25	С	25	С	
NE 195th Street/North Creek Parkway	51	Е	51	Е	51	Е	51	Е	
120th Avenue NE/ North Creek Pkwy	15	С	16	С	16	С	16	С	
NE 180th Street/132nd Avenue NE	116	F	116	F	116	F	116	F	
132nd Avenue NE/SR-522 WB Ramps	27	С	28	С	28	С	28	С	

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

All roadways identified within the construction route are characterized by good pavement conditions and pedestrian amenities. The roadways should be able to physically accommodate construction vehicles and are not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

Access to facilities attracting non-motorized activities may be affected in the vicinity of the portal. A police station is located just northwest of the portal siting area. There are also two parks in the area, called North Creek Sportsfields. One park is north of the portal sites, between North Creek Parkway and 120th Avenue NE, and the other straddles North Creek Parkway within two of the proposed siting locations, sites A and B.

Operational

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes a drop structure below ground and aboveground reuse of the existing North Creek PS odor control system and a chemical injection facility. These facilities would increase traffic in the vicinity of the structure by approximately two trips per week to conduct maintenance and inspection.

Maintenance checks would generally require a two- to four-person crew in a county truck.

Portal 11 (Primary)

Additional construction activity to connect existing sewer lines to the Unocal conveyance tunnel would occur in the vicinity of Portal 11. These pipeline connections would be accomplished with short open-cut construction methods on land adjacent to and off of the existing roadway system. Occasionally, truck access would be accomplished with flaggers. When construction occurs at roadways, at least one lane in each direction would be maintained.

Construction impacts and operational impacts including the pump station are similar to those discussed above for Portal 11 of the Route 9 conveyance corridor. The number of trips and impacts on the study intersections are summarized in Tables 98 and 99. In addition, occasional access to the pump station at this portal site would be required for maintenance checks.

Table 98. Unocal Corridor, Portal 11 – Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	42	5
Concrete Truck Trips	0	0
Construction Worker Trips	88	44
Misc. Vehicle/Materials Delivery	22	2
Total Trips	152	51

Source: URS, August 19, 2003

Table 99. Unocal Corridor, Portal 11 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

		No Action		Site A		Site B		e C
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
Route 9 Site - 228th Corridor								
NE Bothell Way/68th Avenue NE	118	F	121	F	121	F	126	F
NE Bothell Way/Bothell Everett Highway	88	F	89	F	89	F	89	F
68th Avenue NE/NE 175th Street	17	В	17	В	17	В	17	В
68th Avenue NE/NE 181st Street (northern T)	9	Α	9	Α	9	Α	9	Α
68th Avenue NE/NE 181st Street (Rite-Aid)	13	В	13	В	13	В	13	В

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portal 7 (Primary)

Construction Impacts

Portal 7 is shared with the Route 9–195th Street corridor and is discussed there. However, it is secondary in the Route 9 system and primary in the Unocal system, so the Unocal impact is different.

The No Action Alternative is the same: the Ballinger Way NE/15th Avenue NE intersection would continue to operate at LOS E, and the Ballinger Way NE/25th Avenue NE and SR-104/I-5 Southbound Ramps intersections would remain at LOS C.

Construction of the portal is expected to peak in 2007. The construction duration of the portal is approximately 3.0 years. The peak construction activities for Portal 7 are characterized by the number of construction trips shown in Table 100.

Table 100. Unocal Corridor, Portal 7 -- Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak-Hour Trips			
Earthwork Truck Trips	56	7			
Concrete Truck Trips	0	0			
Construction Worker Trips	88	44			
Misc. Vehicle/Materials Delivery	22	2			
Total Trips	166	53			

Source: URS, August 19, 2003.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic would increase delays at the study intersections slightly. The intersections of Ballinger Way NE/25th Avenue NE and SR-104/I-5 Southbound Ramps would operate at LOS D, which is still within acceptable operating conditions as defined by WSDOT. The Ballinger Way/15th Avenue NE intersection would remain at LOS E conditions. The impacts are shown in Table 101.

Table 101. Unocal Corridor, Portal 7 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site	A	Site B		Site C	
Intersection	Delay ^a	LOS						
Ballinger Way NE/25th Avenue NE	31	С	40	D	40	D	40	D
Ballinger Way NE (SR-104) at 15th Avenue NE	66	Е	75	E	75	Е	75	E
SR-104/I-5 SB Ramps	32	С	44	D	44	D	44	D

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Portions of Ballinger Way NE and 25th Avenue NE may experience adverse impacts to pedestrians and non-motorized vehicles where existing separated facilities are not available, and they may be required to share the roadway with construction vehicles.

25th Avenue NE may also experience impacts to pavement from the construction vehicle traffic, and on-street parking operations may be affected during construction activities.

Brugger's Bog Park is located within one of the alternative portal sites, site C. A Park-n-Ride lot is also located to the west of the portal siting area, on Forest Park Drive NE near NE 195th Place.

Operational Impacts

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

The portal's ultimate use includes a force main discharge structure below ground and an aboveground three-stage odor control building with electrical room. These facilities would increase traffic in the vicinity of the structure by approximately two trips per week for maintenance and inspection.

Maintenance checks would generally require a two- to four-person crew in a county truck.

Portal 3 (Primary)

Construction

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and

historical traffic growth. Based on the intersection analysis, the Edmonds Way/232nd Street SW intersection is expected to operate at unacceptable levels, as defined by the responsible jurisdiction, under the future No Action Alternative. The intersection is projected to decline to LOS E. The SR-104/I-5 Southbound Ramps intersection would remain at LOS C.

Construction of the portal is expected to peak in 2007. The construction duration is approximately 1.3 years. The peak construction activities for Portal 3 are characterized by the number of construction trips shown in Table 102.

Table 102. Unocal Corridor, Portal 3 -- Estimated Peak Project Construction Trips

Site	Daily Trips	P.M. Peak Hour Trips
Earthwork Truck Trips	30	4
Concrete Truck Trips	0	0
Construction Worker Trips	40	20
Misc. Vehicle/Materials Delivery	6	1
Total Trips	76	24

Source: URS, August 19, 2003.

The above trips were overlaid onto the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic is projected to increase average vehicle delays at both study intersections. The LOS for the SR-104/I-5 Southbound Ramps would decline to LOS D for all portal alternatives. LOS D remains within acceptable operating conditions as defined by the responsible jurisdiction, WSDOT. Edmonds Way/232nd Street SW would decline to LOS F. Table 103 summarizes the impacts.

Table 103. Unocal Corridor, Portal 3 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site D		Site	E	Site F	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
SR-104/I-5 SB Ramps	32	С	44	D	44	D	44	D
Edmonds Way/232nd Street SW b	37	Е	50	F	50	F	50	F

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

SR-104 within the construction route is characterized by good pavement conditions and pedestrian amenities. The roadway should be able to physically accommodate construction vehicles and is not anticipated to sustain major impacts to pavement or other physical features during construction. Pedestrians and non-motorized users are not anticipated to be adversely affected.

^b Delay represents the highest delay on the stop controlled legs of the intersection (232nd Street SW)

232nd Street SW and 92nd Avenue W may experience adverse impacts to pavement from construction vehicle traffic. Additionally, pedestrians and non-motorized vehicles may be required to share the roadway with construction vehicles.

A fire station is located to the northeast of the portal siting area, near 231st Street SW and 88th Avenue W.

Operational

Since the completed conveyance system would be largely below ground, operational impacts would be limited to periodic maintenance checks. These checks are assumed to occur on an average of twice per week and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 13 (Secondary)

Construction

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, Bothell Way NE/Bothell-Everett Highway is expected to operate at LOS F under the future No Action Alternative.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak-hour traffic operations.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes.

The additional construction traffic would have minimal effects on the study intersection. Table 104 summarizes the impacts.

Table 104. Unocal Corridor, Portal 13 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site B		Site C	
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS	Delay ^a	LOS
NE Bothell Way/Bothell Everett Highway	88	F	89	F	89	F	89	F

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 12 (Secondary)

Construction

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, both intersections are expected to operate at LOS E/F under the future no-action scenario. These are unacceptable levels as defined by the responsible jurisdiction.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak hour traffic operations.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities were included in the total volumes.

The additional construction traffic would have minimal effects on the study intersections. All intersections would operate similarly to the No Action Alternative. The impacts are summarized in Table 105.

Table 105. Unocal Corridor, Portal 12 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No A	Site	C	Site E		
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS
NE Bothell Way/Bothell Everett Highway	88	F	89	F	89	F
80th Avenue NE/NE Bothell Way	59	Е	61	Е	61	Е

Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These

checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 10 (Secondary)

Construction

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, all of the study intersections are expected to operate at or beyond the LOS standard except under the future no-action scenario.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would have a minimal affect on peak hour traffic operations. Table 106 summarizes the impacts.

Table 106. Unocal Corridor, Portal 10 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No Action		Site A		Site C		Site D		Site E	
Intersection	Delay	LOS	Delay ^a	LOS						
NE Bothell Way / Bothell Everett Hwy	88	F	89	F	89	F	89	F	89	F
NE Bothell Way / 80th Avenue NE	59	Е	61	Е	61	Е	61	Е	61	E
NE Bothell Way / 68th Avenue NE	118	F	121	F	121	F	121	F	121	F

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

Portal 5 (Secondary)

Construction Impacts

A straight-line growth factor of 1 percent per year was applied to the existing study intersection traffic volumes to estimate the 2007 background traffic volumes during the construction period. The growth is consistent with the PSRC regional model forecasts and historical traffic growth. Based on the intersection analysis, the Ballinger Way NE/15th Avenue NE intersection is expected to operate below the acceptable roadway operating

conditions under the future No Action Alternative. This intersection would continue to operate under LOS E conditions.

Secondary portals are not expected to be constructed; but if needed, construction of the portal is expected to peak in 2007. The duration of construction is approximately 4 to 5 months. The secondary portal, if required, would consist of a shaft approximately 3 to 4 feet in diameter if used for ventilation. Secondary portals could be up to 10 feet in diameter for grouting and, if needed, entry access. The construction traffic generated would consist of an average of three trucks per day (Source: Appendix 3-G, Construction Approach and Schedule: Treatment Plant, Conveyance, Outfall) and would not affect peak hour traffic operations.

The above trips were overlaid on the future background traffic volumes to characterize conditions with the construction traffic. Additionally, any cumulative construction-related traffic from surrounding portals and/or treatment plant facilities was included in the total volumes

The additional construction traffic would have minimal effects on the study intersections. Delay at the SR-104/I-5 SB ramp intersection would increase to LOS D levels, which is still acceptable under WSDOT standards. Table 107 summarizes the impacts.

Table 107. Unocal Corridor, Portal 5 – Estimated 2007 Intersection P.M. Peak-Hour Traffic During Construction

	No A	ction	Site	X	Site	B
Intersection	Delay	LOS	Delay ^a	LOS	Delay ^a	LOS
Ballinger Way NE (SR-104) at 15th Avenue NE	66	Ε	75	Е	75	Е
SR-104/I-5 SB Ramps	32	С	44	D	44	D

^a Average delay, measured in seconds per vehicle, includes deceleration time, stopped time, and acceleration time due to intersection controls.

Operational Impacts

Since the completed conveyance system would be below ground, operational impacts would be limited to periodic maintenance checks of any permanent tunnel access,. These checks are assumed to occur on an average of once per year and therefore would not contribute significantly to overall traffic volumes in the vicinity.

3.3 Outfall Zones

3.3.1 Construction

Impacts Common to Both Zones

During construction of the marine outfall, both land-based and marine traffic in the vicinity of Point Wells and Point Edwards would be temporarily impacted. The proposed outfall alignments would not extend into the marine traffic lanes. However, construction methods at both Zones 6 and 7S may require anchor lines, pipelines floated into position, tugs, and barges that may temporarily enter or cross maritime traffic lanes. During construction, commercial and recreational maritime traffic would have to navigate around

in-water construction vessels as well as their anchor systems. Potential impacts to the land traffic system would be related mainly to increased traffic volumes associated with removal of excavated materials and pipeline material delivery for construction of the onshore pipeline.

Excavated soils removed during onshore construction would likely be transported by dump trucks to a regulated landfill site selected on the basis of the presence and concentration of contaminants, if any, in the soils. Excavated soils could be stored at the outfall construction staging area (at Portal 19 for construction in Zone 7S and at the Unocal plant site for construction in Zone 6) and transported during non-peak traffic hours.

Soils excavated by barge-mounted equipment during nearshore construction would likely be transported by barge and disposed of at aquatic disposal sites regulated by the U.S. Army Corps of Engineers. The "working barge," equipped with a crane for excavation and laying pipeline segments, would be anchored to the seafloor with "spuds." Spuds act like pins sticking into the seafloor below the barge and can be used in water as deep as 60 feet. Spuds can be raised and lowered to allow movement of the working barge. Since the spuds move up and down vertically from the barge, no additional footprint space (barges are typically 75 by 200 feet) would be required. For barges supplying the working barge, or for barges beyond water depths of 60 feet, anchor lines would be used. Anchor lines extend from the barge in several directions and are typically 1,000 feet long, but could be up to 2,000 feet long.

Offshore construction would not require excavation. However, during construction, commercial and recreational maritime traffic would have to navigate around in-water construction vessels as well as their anchor systems.

Zone 6

Construction activity at Zone 6 would take place near the Edmonds Marina, tribal fishing areas, the Unocal dock, and the Edmonds Terminal. An underwater sea park is located approximately 1.25 miles north of Zone 6. Barges for potential marine disposal of material excavated during outfall construction are not expected to significantly impact access to any of these areas or marine traffic in or near Zone 6.

Estimated total truck and barge trips for removal of excavated material and delivery of construction materials (backfill and pipeline segments) for outfall pipeline installation in Zone 6 are as shown in Table 108. The truck and barge trip estimates assume a typical truck capacity of 16 cubic yards (cy) and a typical barge capacity of 1,500 cy. Excavation and backfill material volumes are discussed in Chapter 4 of the Final EIS and assume open-trench construction onshore and through the nearshore. Excavation and backfill material volumes would be reduced if tunnel construction were used.

Table 108. Estimated Total Truck and Barge Trips - Zone 6

Onshore Construction	Number of Trips (Truck)
Excavated Material Removal	590
Backfill and Pipeline Segment Delivery	570
Nearshore Construction	Number of Trips (Barge)
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Excavated Material Removal	17

The anticipated duration of onshore trench construction is 1 to 2 months; thus, 13 to 27 truck trips per day would be required for removal of onshore excavated soils. Pipe segments and backfill materials are likely to be delivered to the plant site staging area over a period of 2 to 3 months prior and/or during construction. Eight to 12 trucks trips per day would be required for delivery of materials over that time period. Truck traffic impacts similar to those described for treatment plant construction at the Unocal site may occur along access routes as a result of traffic generated during construction.

The anticipated duration of nearshore trench construction is 2 to 3 months; thus, 4 to 7 barge trips per month would be required for removal of in-water excavated soils. Four to 7 barge trips would be required for backfill material and pipeline segment delivery during installation of the nearshore trench. Barge traffic would use U.S. Coast Guard established maritime traffic lanes for the removal of excavated material and delivery of construction materials. Responsible parties would be contacted in order to coordinate construction activities with other marine traffic and recreational use. However, it may be necessary for ferry service vessels to deviate slightly from established ferry routes. Location of recreational fishing and boating activities, such as fishing derbies or yacht races near Zone 6, would likely be altered during construction of the marine outfall. Barge movements would be coordinated with affected tribal governments.

Peak construction of the Zone 6 outfall was assumed to occur concurrently with the Unocal Site peak construction period. Therefore, transportation impacts were incorporated with the Unocal site analyses.

Zone 7S

Construction activity at Zone 7S would take place near the Chevron Richmond Beach Asphalt Terminal at Point Wells. Marine construction vessel traffic would be coordinated with vessels accessing the Chevron Richmond Beach Asphalt Terminal and is not expected to significantly impact Chevron's commercial activities. Location of recreational fishing and boating activities near Zone 7S, such as fishing derbies or yacht races, would likely be altered during construction of the marine outfall.

Estimated truck and barge trips for removal of excavated material and delivery of construction materials (backfill and pipeline segments) for outfall pipeline installation in Zone 7S are as shown in Table 109. The truck and barge trip estimates assume a typical truck capacity of 16 cubic yards (cy) and a typical barge capacity of 1,500 cy. Excavation

and backfill material volumes are discussed in Chapter 4, Earth, and assume open-trench construction onshore and through the nearshore. Excavation and backfill material volumes would be reduced if tunnel construction were used.

Table 109. Estimated Truck and Barge Trips - Zone 7S

Onshore Construction	Number of Trips (Truck)
Excavated Material Removal	1,000
Backfill and Pipeline Segment Delivery	1,000
Nearshore Construction	Number of Trips (Barge)
Excavated Material Removal	13
Backfill and Pipeline Segment Delivery	14

The anticipated duration of onshore trench construction is 1 to 2 months; thus, 22 to 46 truck trips per day would be required for removal of onshore excavated soils. Pipe segments and backfill materials are likely to be delivered to the plant site staging area over a period of 2 to 3 months prior and/or during construction. Fifteen to 23 truck trips per day would be required for delivery of materials over that time period.

The anticipated duration of nearshore trench construction is 2 to 3 months; thus, 4 to 7 barge trips per month would be required for removal of in-water excavated soils. Four to 7 barge trips would be required for backfill material and pipeline segment delivery during installation of the nearshore trench. Barge traffic would use U.S. Coast Guard established maritime traffic lanes for the removal of excavated material and delivery of construction materials. Barge traffic for construction of the marine outfall would be coordinated with affected tribal governments and with Chevron officials so that marine traffic accessing the Chevron Richmond Beach Asphalt Terminal is not interrupted.

Peak construction of the Zone 7S outfall was assumed to occur concurrently with the Portal 19 peak construction period. Therefore, the Zone 7S outfall transportation impacts were incorporated with the Route 9 Portal 19 analyses.

3.3.2 Operational

Impacts Common to Both Zones

Normal operation of the marine outfall would not impact marine transportation within Zones 6 or 7S. The outfall pipeline would be buried below the seabed to a water depth of approximately –80 feet MLLW. Below this depth the pipeline would be laid directly on the seabed. There would be no above-water or near-surface structures that could impact vessel traffic, nor would there be any restrictions on anchoring as a result of the outfall.

Land transportation would not be impacted by operation and maintenance of the outfall. Regular maintenance requirements for the outfall pipelines include cathodic protection monitoring of steel pipelines and periodic inspection. Inspection and maintenance of the cathodic protection system would be performed periodically by King County staff and would not require equipment that would impact marine transportation.

It is anticipated that visual inspection of the pipeline would be performed by divers and/or a remotely operated vehicle (ROV) approximately every 5 years and after any significant seismic event. Inspection activities would occur below the water surface and would be supported by one or more surface vessels. Inspection vessels would not interfere with commercial or recreational maritime traffic.

3.4 Cumulative Impacts

Cumulative impacts and associated mitigation measures of the project with its surroundings are inherent in the methodologies utilized for the traffic impact analyses. The preceding sections of 3.0 Impacts take into account cumulative effects as follows:

- Background traffic growth of one percent per year is consistent with historical and projected growth within the study area. The growth accounts for general population and traffic increases associated with transportation trends and unspecified developments.
- Planned roadway improvements are described above under the Planned Improvements discussion. Analyses accounted for planned changes to the transportation network.
- Planned developments are also described above in the Planned Improvements discussion.
- For each alternative, traffic associated with treatment plant, conveyance system and outfall trips were overlayed onto the future background traffic volumes prior to performing analyses.

Specific planned projects that could potentially create cumulative transportation impacts were examined. Two projects are likely to occur near the Route 9 site; SR-9 Roadway Improvements and the Costco Warehouse development. At the Unocal site, the Edmonds Crossing multimodal facility could be constructed during the same timeframe on a structural lid over the Unocal treatment plant.

All traffic analyses were performed for the highest, or p.m., peak hour period. The comparisons of cumulative impacts, below, begin with baseline (no action) conditions and add factors (Brightwater construction, concurrent construction, etc.) progressively.

SR-9 Improvement Project

Cumulative impact analyses for the SR-9 roadway improvements were performed for intersections along SR-9. The analyses indicate that two study intersections would be affected with the Route 9 plant construction: SR-9 at 228th Street and SR-9 at SR-522 Eastbound ramps.

The intersection LOS for the 2007 No Action scenario was estimated at LOS D for both intersections. With the treatment plant construction these intersections would decline to LOS F and E, respectively.

With concurrent construction of the Route 9 plant and the SR-9 improvements, the SR-9/228th Street SE intersection would experience greater delays. However, LOS level would be LOS F, the same as if construction were not concurrent. The SR-9/SR-522

Eastbound ramps intersection would be at LOS E whether or not construction is concurrent.

Concurrent construction would also increase delays at the intersection of SR-9 and SR-524, causing a decline from LOS E to LOS F. Non-concurrent construction would not affect this intersection.

LOS analyses were also conducted for operation of the completed treatment plant, assuming completion of the SR-9 improvements. All intersections on SR-9 are projected to operate at acceptable LOS D or better (WSDOT standards) through Year 2040.

Costco Warehouse Development

Cumulative impact analyses for construction of a Costco Warehouse were performed for the intersections along SR-9. The analyses indicate that two study intersections would be affected with the Route 9 plant construction: SR-9 at 228th Street SE and SR-9 at SR-522 Eastbound ramps.

The intersection LOS for the 2007 No Action Alternative was estimated at LOS D for both intersections. With the treatment plant construction these intersections would decline to LOS F and E, respectively.

With concurrent Brightwater and Costco peak construction, the analysis indicates that the combined construction traffic would cause minimal delays over the 2007 Brightwater-only construction traffic. The increase would be only 0 to 2 seconds, and LOS would be the same at LOS F and E, respectively.

Cumulative SR-9 Construction and Costco Warehouse Operation

Cumulative impact analyses assuming concurrent construction of the Brightwater and SR-9 projects, concurrent with Costco Warehouse operations, were performed for intersections along SR-9. This combination would have the greatest impact of all planned projects and developments in the study area.

The assumed 2007 base condition was concurrent Brightwater and SR-9 construction (see above) without considering Costco. In this condition, the intersection of SR-9 and SR-522 Westbound ramps would experience LOS C for the 195th Street corridor alternative or LOS D for the 228th Street corridor alternative.

The additional traffic associated with the Costco Warehouse operation is expected to increase delays at several study intersections. The SR-9/SR-522 Westbound ramps intersection would experience small delay increases, changing its LOS from LOS C (195th Street corridor)/D (228th Street corridor) to LOS E for both corridors. Only small increases in delay would occur at SR-9/228th Street SE and SR-9/SR-524.

Unocal Structural Lid Sub-Alternative

Cumulative construction impact analyses were performed for the Unocal treatment plant and the structural lid for the proposed Edmonds Crossing facility. The analyses indicate that two study intersections along SR-104 would be affected: SR-104 at 100th Avenue W and SR-104 at I-5 Southbound off-ramp.

The intersection LOS for the 2007 No Action Alternative was estimated at LOS E for SR-104/100th Avenue W and LOS C for SR-104/I-5 Southbound off-ramp. With the treatment plant construction these intersections would decline to LOS F and D, respectively.

With construction of the lid, the total estimated daily construction trips to the Unocal site in the peak construction period (Year 2007) are slightly lower than without the lid. Cumulative intersection and roadway operations would be similar with or without lid construction.

Concurrent construction of the lid would, however, increase the required work force. The increase in construction workers would require that at least two candidate parcels be used together for remote worker parking. As a result, the intersection and roadway impacts would be greater surrounding the candidate parcel sites for the parking facilities. Intersection LOS would likely decline in the direct vicinity of the remote parking facilities

Unocal Structural Lid Sub-Alternative and Edmonds Crossing

Cumulative impact analyses were performed considering construction of the Unocal treatment plant, structural lid, and Edmonds Crossing. The analysis indicate that, as stated above under "Unocal Structural Lid Sub-Alternative," two study intersections along SR-104 would be affected: SR-104 at 100th Avenue W and SR-104 at I-5 Southbound offramp.

The intersection LOS for the 2007 No Action Alternative was estimated at LOS E for SR-104/100th Avenue W and LOS C for SR-104/I-5 Southbound off-ramp. With the treatment plant and structural lid construction these intersections would decline to LOS F and D, respectively.

For this scenario, delays are projected to increase slightly at the study intersections. However, LOS levels are projected to remain the same as for construction of the treatment plant and lid only. Segment LOS would also remain the same.

Cumulative impacts during 2040 operations of both facilities would change LOS from D to F at the SR-104/Dayton Street intersection. The SR-104/Pine Street intersection would be signalized in the cumulative scenario and would operate acceptably at LOS C. The SR-104/100th Avenue W intersection would operate at LOS F under both cumulative and non-cumulative conditions; however, delays would increase significantly with the Edmonds Crossing traffic. All other Unocal study intersections would remain at LOS F.

Mitigation Measures for Cumulative Impacts

Mitigation measures to address the cumulative impacts are consistent with the Brightwater mitigation plan. During construction, temporary adjustments to traffic signals and lane approaches, as well as traffic control flaggers, would be utilized to improve conditions to the No-Action or better. King county would coordinate construction activities among the concurrent projects to minimize impacts and disruption of traffic flow.

Mitigation measures to address cumulative impacts during 2040 operations consist mainly of potential measures to address background infrastructure deficiencies. These deficiencies would not be required to be addressed by King County. One exception is the SR-104/Dayton Street intersection, where additional turn lanes and optimized signal timing are proposed.

4 MITIGATION MEASURES

This section identifies mitigation concepts to reduce potential adverse impacts. Specific mitigation plans will be established with permitting agencies during the permit application process.

4.1 Mitigation Measures Common to Treatment Plant and Portal Sites

The following measures have been identified to reduce the adverse impacts on the transportation systems common to treatment plant and portal sites and along access routes during construction.

- Develop and implement a Traffic Management Plan (TMP) for movement of employees, equipment, and materials to reduce impacts along project traffic travel corridors. Coordinate with local agencies for final plan approval, including construction hours, provision of adequate non-motorized access, a pavement monitoring program, truck access routes (i.e., Snohomish County haul agreement, Section 13.40.080 SCC), and acquisition of necessary permits for the construction of the plant and conveyance system.
- Notify the police, fire, ambulance, and transit agencies of lane encroachments and provide flagger or other traffic controller to maintain safe public access and emergency vehicle access routes. Off-duty police hired by the project sponsor may be required to direct traffic near the site during construction.
- Provide necessary traffic control at all affected locations, including temporary signing, striping, and traffic signals, as required. All temporary traffic control plans are subject to permitting jurisdiction review and approval.
- Maintain traffic flow and access to properties affected by the construction activities.
- Provide onsite parking management plan for all construction workers and visitors.
 Carpools would be encouraged and would receive first-priority on long-term parking spaces or other incentives.
- Monitor progress of other potential roadway construction projects along routes used for construction traffic access to Brightwater. Evaluate need to modify routes or times of operation to avoid conflicts with such other projects.
- Monitor the condition of the streets directly affected by Brightwater construction over the course of the project, and provide traffic mitigation as determined in conjunction with local jurisdictions. Restore streets affected by construction to preconstruction conditions.
- Provide safe access for bicyclists and pedestrians during construction. This may require construction of temporary or permanent facilities for non-motorized traffic.
- Provide multiple sources of construction activity updates such as informational signage, newspaper notices, and/or a project website.
- Coordinate all utility construction activities to minimize disruptions to traffic.
- Coordinate all planned improvement/construction projects with the appropriate jurisdictions. Provide an overall construction schedule including planned local and

regional construction improvements projects to minimize conflicts with the project construction activities.

4.2 Route 9—195th Street Alternative (Preferred) and 228th Street Alternative

4.2.1 Construction

Mitigation measures for the Route 9 site include those that are common to both sites with the exception of a parking management plan. The Route 9 site would be provided with adequate onsite parking to accommodate construction vehicles and workers.

A potential co-use of the Chevron Richmond Beach Asphalt Terminal for transporting excavation spoil and construction materials may be considered to alleviate construction traffic access at Portal 19.

King County will mitigate potential construction traffic impacts to SR-9, from SR-522 to SR-524, and on 228th Street SE attributable solely to construction of the Brightwater project to the greatest extent practicable, so that peak period delay resulting from and directly attributable to Brightwater construction will be no worse than the No Action Alternative as identified in the Brightwater Final Environmental Impact Statement. The traffic analysis methodology to be used to address impacts during the permitting phase will be the Snohomish County traffic analysis procedures and the Synchro traffic simulation software.

Possible impacts to peak period operating conditions directly attributable to the added impact of Brightwater construction traffic, as opposed to other sources of future traffic congestion, will be mitigated to the extent practicable by using one or a combination of the following three options.

- 1. King County could coordinate with WSDOT to expedite the SR-9 road construction to minimize or eliminate the overlap with Brightwater construction; or
- 2. King County could revise the timing of its traffic uses associated with Brightwater construction to the extent practicable in an effort to reduce the conflict; or
- 3. King County could limit or reduce vehicle traffic access to the site during peak traffic periods to the extent practicable and possible, given the paramount need of having the Brightwater system constructed and in operation by 2010.

If Snohomish County finds during permitting that concurrent Brightwater and WSDOT project construction would create significant adverse environmental impacts after application of one or all of the mitigation measures defined above, then Snohomish County may require King County to apply additional reasonable and practicable measures to mitigate those traffic impacts attributable to the Brightwater project.

Analysis of the affected roadways during the peak treatment plant construction period showed that the construction traffic would have minimal impact on roadway segment and intersection LOS ratings, if not constructed concurrently with the SR-9 roadway improvements. However, several study intersections would experience higher delays in comparison to the No Action Alternative.

Temporary mitigation measures are proposed for key impacted intersections along the two proposed Route 9 site conveyance corridors during construction and are summarized in Tables 110 and 111. The proposed temporary mitigation measures in conjunction with the TMP and King County commitments are projected to improve intersection operations to at least the no-action levels if SR-9 improvements are not constructed concurrently. Additional measures will be taken to mitigate concurrent construction.

Individual intersection operations were considered in this analysis; therefore, results may vary because any coordinated signals would need to be analyzed on a system-wide basis. The proposed flaggers are to provide traffic control for construction activities and for safety needs. Where these measures are not adequate to mitigate the temporary impact from the Brightwater project, consideration would be given to modifying truck routes or timing of construction as described in Section 4.1.

Table 110. Route 9 Site and 195th Street Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

	Proposed Mitigation Measures			
Intersection	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary re- striping of impacted approach lanes	
Ballinger Way NE (SR-104) at 15th Avenue NE	Х	-	Х	
Bothell Way NE (SR-522) at Bothell- Everett Hwy (SR-527)	Х	_	Х	
Bothell Way NE (SR-522) at 68th Avenue NE	Х	_	Х	
N 185th Street at SR-99	X	_	X	
NE 195th Street at 120th Avenue NE	Х	Х	Х	
NE 195th Street at North Creek Parkway	Х	Х	Х	
80th Avenue NE at NE 195th Street (unsignalized)	_	Х	Х	
SR-9 at SR-522 Eastbound Ramps	X			
SR-9 at SR-524	X	_	_	
Beardslee Boulevard/Ross Road (unsignalized)	Х	Х	Х	

X This denotes mitigation measure is proposed.

This denotes mitigation measure is not proposed.

Table 111. Route 9 Site and 228th Street Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

	Proposed Mitigation Measures			
Intersection	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary re- striping of impacted approach lanes	
Bothell Way NE (SR-522) at Bothell- Everett Hwy (SR-527)	Х	_	Х	
Bothell Way NE (SR-522) at 68th Avenue NE	Х	_	Х	
N 185th Street at SR-99	Х	_	Х	
NE 195th Street at 120th Avenue NE	Х	X	Х	
NE 195th Street at North Creek Parkway	X	X	X	
80th Avenue NE at NE 195th Street (unsignalized)	-	Х	Х	
SR-9 at SR-522 Eastbound Ramps	Х	_	_	
SR-9 at SR-524	Х	_	_	
SR-9 at SR-522 Westbound Ramps (unsignalized)	Х	-	-	
Beardslee Boulevard/Ross Road (unsignalized)	Х	Х	Х	

X This denotes mitigation measure is proposed.

Specific locations for mitigation along the construction routes were also identified based on the existing roadway conditions and geometry. Tables 112 and 113 identify the roadways along the construction routes for the Route 9–195th Street corridor and Route 9–228th Street corridor, respectively. The tables identify possible mitigation to address pavement conditions, provide access for non-motorized travel modes, and provide onstreet parking. All construction routes shall be subjected to the full TMP and mitigation measures described in Section 4.1; however, based on the existing conditions, the following locations should be monitored.

Table 112. Route 9 Site and 195th Street Corridor – Construction Route Mitigation Measures

	Proposed Mitigation Measures			
Roadway Section ^a	Pavement Conditions	Non-Motorized Facilities	On-street Parking	
SR-522	_	Х	_	
68th Avenue NE	_	_	_	
NE 175th Street	X	Х	X	
80th Avenue NE	X	Х	_	
NE 195th Street	X	X	-	
NE 120th Avenue	-	_	_	

⁻ This denotes mitigation measure is not proposed.

Table 112. Route 9 Site and 195th Street Corridor -**Construction Route Mitigation Measures**

	Proposed Mitigation Measures			
Roadway Section ^a	Pavement Conditions	Non-Motorized Facilities	On-street Parking	
North Creek Parkway	_	_	_	
SR-104	_	_	_	
15th Avenue NE	_	_	Х	
SR-99	X	Х	_	
N 185th Street	_	_	_	
NW Richmond Beach Road	_	_	_	
NW 195th Street	_	_	_	
NW 196th Street	_	Х	_	
Richmond Beach Drive	_	Х	_	

X This denotes mitigation measure is proposed.

Table 113. Route 9 Site and 228th Street Corridor -**Construction Route Mitigation Measures**

	Propose	Proposed Mitigation Measures			
Roadway Section ^a	Pavement Conditions	Non-Motorized Facilities	On-street Parking		
SR-522	_	Х	_		
68th Avenue NE	_	_	_		
NE 175th Street	Х	Х	Х		
80th Avenue NE	X	Х	_		
NE 195th Street	Х	Х	_		
NE 120th Avenue	_	_	_		
North Creek Parkway	_	_	_		
SR-527	_	_	_		
228th Street SW	_	Х	X		
224th Street SW	_	Х	X		
Locust Way	Х	Х	_		
73rd Avenue W	_	Х	X		
SR-99	X	Х	_		
N 185th Street	_	_	_		
NW Richmond Beach Road	_	_	_		

October 2003 146

⁻ This denotes mitigation measure is not proposed. $^{\rm a}$ Roadway sections vary within the construction route corridor. Issue may apply to only portions of the roadway.

Table 113. Route 9 Site and 228th Street Corridor – Construction Route Mitigation Measures

	Propose	ures	
Roadway Section ^a	Pavement Conditions	Non-Motorized Facilities	On-street Parking
NW 195th Street	_	_	_
NW 196th Street	_	Х	_
Richmond Beach Drive	_	Х	_

X This denotes mitigation measure is proposed.

4.2.2 Operation

Trucks accessing the site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals and for biosolids transport would be designated during the permitting phase. These routes would be determined upon selection of a preferred site for the treatment plant.

Because operating the Brightwater Treatment Plant would reduce traffic on the surrounding roadway network in comparison to the No Action Alternative, mitigation requirements beyond the existing development regulations for the operation of the treatment plant would be minimal. King County would work with local agencies to identify necessary site-specific traffic mitigation measures.

Specific mitigation measures at the study intersections were investigated for the operational phase of the project. The mitigation measures are recommended for two categories: proposed and potential measures. Proposed mitigation addresses the operational deficiencies created by the addition of vehicles generated by the Brightwater project. These deficiencies should be mitigated by King County in conjunction with this project. Potential mitigation addresses background infrastructure deficiencies, not caused by the Brightwater project traffic. These deficiencies are noted, but would not be required to be addressed by the County in conjunction with the Brightwater project.

Operations at the study intersections during 2010 would not require mitigation. The implementation of WSDOT's SR-9 Improvements project will improve traffic conditions adjacent to the Route 9 plant site. Table 114 identifies both proposed and potential mitigation actions for the Route 9 plant site during the 2040 operational phase if the SR-9 Improvements is not built. Without SR-9 Improvements, the majority of the study intersections during the 2040 operations are projected to operate at unacceptable LOSs without the development of the Brightwater project. All mitigation provided would be potential measures to address background traffic increases in the study area by responsible agencies. Upon completion of the proposed SR-9 Improvements project, the mitigation below would not be required.

⁻ This denotes mitigation measure is not proposed.

^a Roadway sections vary within the construction route corridor. Issue may apply to only portions of the roadway.

Table 114. Route 9 Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic during 54-mgd Operation

Interception	Mitigation Measures		
Intersection	Proposed	Potential	
228th Street SE at Woodinville-Snohomish Road (SR-9)	• None	Increase cycle length to provide more green time for NB through movement	
Bothell-Everett Hwy (SR-527) at 228th Street SW	• None	 Provide additional NB left- and right-turn lanes Provide additional EB left-turn and through lanes Optimize signal timing 	
Woodinville-Snohomish Road (SR-9) at SR-522 EB Ramps	• None	Provide additional EB left-turn lane	
Woodinville-Snohomish Road (SR-9) at SR-522 WB Ramps (unsignalized)	• None	Signalize intersection	

NB: Northbound, EB: Eastbound, WB: Westbound.

Mitigation measures for the conveyance system were investigated for the operational phase of the project, but impacts were minimal, so no mitigation has been suggested.

4.3 Unocal Site and Conveyance

4.3.1 Construction

Specific additional site mitigation measures would be incorporated into a comprehensive traffic management plan (TMP) that would include the following actions:

- Provide an adequate truck queuing storage facility along SR-104 and onsite to accommodate daily construction staging. The south leg of the SR-104/Pine Street intersection would need to be widened to provide additional northbound left-turn storage from SR-104 to Pine Street and/or maximize the use of shoulder area for truck queue space. All construction traffic entering and leaving the Unocal site would be synchronized with ferry operations by a traffic flagger to avoid conflicts and operation delays.
- As part of the TMP, provide parking offsite for construction workers, who would be bused to the construction site. (Note that with the Edmonds Crossing structural lid construction, two offsite parking areas would potentially be required due to the higher number of construction workers). After the treatment plant is constructed, provide adequate onsite parking for employees and visitors.
- Maintain access between Woodway and Edmonds and for emergency vehicles at all
 times during the construction and realignment of the Pine Street roadway segment just
 west of SR-104. Available pavement for two-way traffic shall be maintained during
 peak traffic hours. Any reduction of pavement width resulting in one travel lane will
 have additional traffic control such as a flagger.

Analysis of the affected roadway segments during the peak construction period showed that the construction traffic would create minimal effect on roadway LOS ratings.

However, several study intersections would experience higher delays in comparison to the No Action Alternative. Temporary mitigation measures are proposed for key impacted intersections along the Unocal conveyance corridor during construction and are summarized in Table 115. The proposed temporary mitigation measures in conjunction with the TMP mitigation are projected to improve intersection operations to at least the no-action levels. Individual intersection operations were considered in this analysis; therefore, results may vary because any coordinated signals would need to be analyzed on a system-wide basis. The proposed flaggers are to provide traffic control for construction activities and for safety needs.

Table 115. Unocal Site and Corridor – Intersection Mitigation Measures – 2007 P.M. Peak-Hour Traffic During Construction

	Propos	es	
Intersection	Temporary signal timing, phasing, and/or cycle length adjustment	Provide flagger and off-duty police for traffic control	Temporary re- striping of impacted approach lanes
Ballinger Way NE (SR-104) at 15th Avenue NE	X	-	Х
Bothell Way NE (SR-522) at Bothell- Everett Hwy (SR-527)	X	-	X
Bothell Way NE (SR-522) at 68th Avenue NE	Х	-	Х
SR-104 at 100th Avenue W	Х	-	_
Edmonds Way (SR-104) at Pine Street (unsignalized)	_	Х	Х
Edmonds Way (SR-104) at 232nd Street SW (flashing red for 232nd Street SW)	-	Х	Х
NE 195th Street at North Creek Parkway	Х	_	_
NE 180th Street at 132nd Avenue NE	Х	_	_
80th Avenue NE at NE Bothell Way	Х	_	_

X This denotes mitigation measure is proposed.

Specific locations for mitigation along the construction routes were also identified based on the existing roadway conditions and geometry. Table 116 identifies the roadways along the construction routes for the Unocal corridor. All construction routes shall be subjected to the full TMP and mitigation measures described in Section 4.1; however, based on the existing conditions, the following locations should be monitored.

⁻ This denotes mitigation measure is not proposed.

Table 116. Unocal Site and Corridor – Construction Route Mitigation Measures

	Proposed Mitigation Measures			
Construction Route ^a	Pavement Conditions	Non-Motorized Facilities	On-street Parking	
NE 195th Street	_	_	_	
North Creek Parkway	_	_	_	
120th Avenue NE	_	_	_	
132nd Avenue NE	_	_	_	
NE 180th Street	_	_	_	
SR-522	_	_	_	
68th Avenue NE	_	_	_	
NE 175th Street	Х	Х	Х	
SR-104	_	Х	_	
25th Avenue NE	X	Х	Х	
232nd Street SW	X	Х	_	
92nd Avenue W	Х	Х	_	

X This denotes mitigation measure is proposed.

4.3.2 Operation

Because operating the Brightwater Treatment Plant would generate minimal traffic impacts to the surrounding roadway network, mitigation requirements beyond the existing development regulations for operation of the treatment plant would be minimal. King County would work with local agencies to identify necessary additional site-specific traffic mitigation measures.

Trucks accessing the site would use established truck routes to minimize unavoidable delays caused by truck traffic. Truck routes for delivery of chemicals and for biosolids transport would be designated during the permitting phase. These routes would be determined upon selection of a preferred site for the treatment plant.

Specific mitigation measures at the study intersections were investigated for the operational phase of the project. The measures are recommended for two categories: proposed and potential measures. Proposed mitigation addresses the operational deficiencies created by the addition of vehicles generated by the Brightwater project. These deficiencies should be mitigated by King County in conjunction with this project. Potential mitigation addresses background infrastructure deficiencies, not caused by the Brightwater project traffic. These deficiencies are noted, but would not be required to be addressed by the County in conjunction with the Brightwater project.

⁻ This denotes mitigation measure is not proposed.

^a Roadway sections vary within the construction route corridor. Issue may apply to only portions of the roadway.

Tables 117, 118, 119, and 120 identify both potential and proposed mitigation actions for the Unocal plant site during 2010 operations, 2040 operations at 56 mgd, 2040 operations at 72 mgd, and 2040 operations with the structural lid.

The study intersection operations would be maintained at the no-action LOS levels, or improved levels, during 2010 operations. Potential mitigation is provided at several of the study intersections.

The majority of the intersections during 2040 operations are projected to be at unacceptable levels, as defined by the responsible jurisdiction, without addition of any project trips. All mitigation provided would be potential measures to address general traffic increases in the study area, with the exception of the Edmonds Way/Dayton Street and Edmonds Way/100th Avenue West intersections in the Edmonds Crossing alternative. These intersections would have a significant increase in delay as a result of the combined treatment plant and Edmonds Crossing traffic. Specific mitigation measures for the impacts of Edmonds Crossing and the treatment plant are listed in Table 120.

Table 117. Unocal Site – Intersection Mitigation Measures – 2010 P.M. Peak-Hour Traffic During 36-mgd Operation

Intersection	Mitigation Measures	
	Proposed	Potential
Edmonds Way (SR-104) at 100th Avenue West	• None	Provide exclusive EB and WB right- turn lanes on Edmonds Way
		 Optimize signal timing
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	• None	 Provide additional EB left-turn and through lanes (add receiving lane) Provide additional SB left-turn lane Provide additional WB through lane Optimize cycle length and signal timing
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	• None	Provide exclusive WB/NB right-turn lane on SR-522

EB: Eastbound, SB: Southbound, WB: Westbound, NB: Northbound

Table 118. Unocal Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic during 54-mgd Operation

Intersection	Mitigation Measures	
	Proposed	Potential
Edmonds Way (SR-104) at 100th Avenue West	• None	 Provide exclusive EB and WB right- turn lanes on Edmonds Way Provide additional NB through lane Optimize signal timing
Aurora Avenue (SR-99) at 244th Street SW	• None	 Provide additional SB left-turn lane Provide additional EB left-turn lane Modify phasing and signal timing on 244th Street SW to protect the left-turn movements

Table 118. Unocal Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic during 54-mgd Operation

Intersection	Mitigation Measures	
	Proposed	Potential
244th Street SW (SR-104) at I-5 Southbound Off-ramp	• None	Optimize signal timingAdd WB through lane
Ballinger Way NE (SR-104) at 15th Avenue NE	• None	 Provide additional EB through lane Provide two exclusive NB left-turn lanes
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	• None	 Provide additional EB and WB through lanes and SB left-turn lanes
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	• None	 Provide additional through and turn lanes on Bothell Way NE

Table 119. Unocal Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic During 72-mgd Operation

Intersection	Mitigation Measures	
	Proposed	Potential
Edmonds Way (SR-104) at 100th Avenue West	• None	 Provide exclusive EB and WB right-turn lanes on Edmonds Way Provide additional NB through lane Optimize signal timing
Aurora Avenue (SR-99) at 244th Street SW	• None	 Provide additional SB left-turn lane Provide additional EB left-turn lane Modify phasing and signal timing on 244th Street SW to protect left-turn movements
244th Street SW (SR-104) at I-5 Southbound Off-ramp	• None	Optimize signal timingAdd WB through lane
Ballinger Way NE (SR-104) at 15th Avenue NE	• None	 Provide additional EB through lane Provide two exclusive NB left-turn lanes
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	None	 Provide additional EB and WB through lanes and SB left-turn lanes
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	• None	 Provide additional through and turn lanes on Bothell Way NE

Table 120. Unocal Site – Intersection Mitigation Measures – 2040 P.M. Peak-Hour Traffic During 54-mgd with Structural Lid and Edmonds Crossing Multimodal Transportation Facility Operation

Intersection	Mitigation Measures		
	Proposed	Potential	
Edmonds Way (SR-104) at Dayton Street	• None	Provide additional WB left-turn laneOptimize phasing and signal timing	
Edmonds Way (SR-104) at 100th Avenue West	 Provide exclusive right-turn lanes on all approaches Provide additional NB through lane Provide additional NB left-turn lane Optimize phasing and signal timing 	• None	
Aurora Avenue (SR-99) at 244th Street SW	• None	 Provide additional SB left-turn lane Provide additional EB left-turn lane Modify phasing and signal timing on 244th Street SW to protect the left-turn movements 	
244th Street SW (SR-104) at I-5 Southbound Off-ramp	• None	Optimize signal timing	
Ballinger Way NE (SR-104) at 15th Avenue NE	• None	 Add WB through lane Provide additional EB and WB through lanes and SB left-turn lanes 	
Ballinger Way NE (SR-104) at Bothell Way NE (SR-522)	• None	Provide additional EB and WB through lanes and SB left-turn lanes	
Bothell Way NE (SR-522) at Bothell-Everett Hwy (SR-527)	• None	Provide additional through and turn lanes on Bothell Way NE	

Mitigation measures for the conveyance system were investigated for the operational phase of the project, but impacts were minimal, so no mitigation has been suggested.

4.4 Outfall Zones

4.4.1 Construction

Construction Mitigation Measures Common to Both Zones

To the extent possible, delivery or removal of materials from the construction sites at Zones 6 and 7S would be minimized during peak traffic periods and would use designated maritime traffic lanes and truck traffic routes. Construction activities would be coordinated with WSDOT, marina, tribal, commercial, and other appropriate officials to reduce interference with marine and land transportation systems. Offshore construction vessels would be marked and lighted in accordance with applicable U.S. Coast Guard regulations so that operators of other vessels would be alerted to their presence and operating status.

Zone 6

Construction vessel traffic would be coordinated with WSDOT to minimize impacts to scheduled ferry service. Construction activities would also be coordinated with marina and tribal government officials to reduce interference with fishing and recreational boating activities. Truck traffic mitigation measures would be followed as described for plant construction.

Zone 7S

Construction vessel traffic and activities would be coordinated with Chevron and tribal government officials to reduce interference with Chevron Richmond Beach Asphalt Terminal operations and tribal fishing. Truck traffic mitigation measures would be followed as described for Portal 19 construction.

4.4.2 Operation

Operational Mitigation Measures Common to Both Zones

Vessels involved in the periodic inspection of the outfall pipeline would be marked and lighted in accordance with applicable U.S. Coast Guard regulations so that operators of other vessels would be alerted to their presence and operating status. Outfall operation would not have impacts on land transportation systems.

5 SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS

5.1 Route 9 Site (Preferred Alternative)

5.1.1 Route 9 Treatment Plant

Construction

During peak construction activities approximately 107 net new p.m. peak-hour trips would be added to the surrounding transportation network. If construction does not occur concurrently with the SR-9 Improvements project, these additional trips would create minimal delays in traffic movement and circulation in the vicinity of the treatment plant site during the peak traffic hours and, while unavoidable, would not be considered significant. The exception is the intersection of SR-9 at 228th Street SE. This intersection would experience a significantly longer average vehicle delay during construction. The LOS would change from D to F with the Brightwater traffic. The net daily trips may actually be less than zero due to current land uses that would be displaced. These land uses generate an estimated 700-900 daily trips, whereas the project would generate approximately 852 daily trips during peak construction activities. Pedestrians may be rerouted from sidewalks and shoulders around the project site. A higher number of accidents could occur as a result of the increased traffic within the study area associated with construction activities. However, this relates to the potential exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

Operation

Long-term impacts would be related to the generation of automobile and truck trips by the treatment plant at full build-out and trips related to the proposed community-oriented building, specific only to the Route 9 site. The treatment plant would generate approximately 235 vehicle trips per day in 2010 (301 in 2040) and 95 trips related to the community-oriented building. This would include 10 truck trips by maintenance and supply trucks during Year 2010 operations (14 in Year 2040). This would be a net benefit because the plant operations traffic would only be one-third the number of vehicles generated under the current land uses of the Route 9 site (700-900 daily trips).

5.1.2 Route 9 Conveyance System—195th Street Corridor

Portal 11

Construction

During peak construction activities, approximately 152 daily trips (51 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during the peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 11, in the Kenmore area, is also located within a commercial area. Pedestrian access to shopping, City Hall, and a Park-n-Ride facility would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 44

Construction

During peak construction activities, approximately 204 daily trips (57 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during the peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 44, in the Kenmore area, is located within a residential neighborhood. Neighborhood activities and access to Westhill Park would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 41

Construction

During peak construction activities, approximately 392 daily trips (100 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 41, in the Bothell area, is generally within an industrial area; however, access to the sports fields would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 5

Construction

During peak construction activities, approximately 126 daily trips (44 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 5, in the Mountlake Terrace/Shoreline area, is located within a commercial area in which access to shopping activities would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 19

Construction

During peak construction activities, approximately 142 daily trips (52 peak-hour trips) would be added to the surrounding transportation network. The concurrent construction of the Zone 7S outfall would increase the number of daily trips by 80 and peak hour by 16. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location. Use of the Chevron Richmond Beach Asphalt Terminal for barge transport of construction materials and excavation spoil would reduce this traffic.

Portal 19, in the Shoreline/Woodway/unincorporated Snohomish County area, would be located within a public utilities area. Access to these facilities would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 45

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 7

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 27

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 23

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

5.1.3 Route 9 Conveyance System—228th Street Corridor

Portal 11

Construction

During peak construction activities, approximately 156 daily trips (53 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 11, in the Kenmore area, is also located within a commercial area. Pedestrian access to shopping, City Hall, and a Park-n-Ride facility would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 44

Construction

During peak construction activities, approximately 156 daily trips (53 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 44, in the Kenmore area, is located within a residential neighborhood. Neighborhood activities and access to Westhill Park would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 41

Construction

During peak construction activities, approximately 156 daily trips (53 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours.. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 41, in the Bothell area, is generally within an industrial area; however, access to the sports fields would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 39

Construction

During peak construction activities, approximately 156 daily trips (53 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 39, in the Bothell area, is located within a residential neighborhood. Neighborhood activities would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 33

Construction

During peak construction activities, approximately 142 daily trips (52 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 33, in unincorporated Snohomish County, is located within a mixed residential and commercial area. Neighborhood activities and access to the commercial area would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 26

Construction

During peak construction activities, approximately 70 daily trips (19 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours. There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each portal location.

Portal 26, in the Mountlake Terrace/Edmonds area, is located within a mixed residential and commercial area. Neighborhood activities and access to the commercial area and Ballinger Park would be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 19

Construction and operational impacts for this portal are the same as in the 195th Street route and are discussed under Section 5.2.2.

Secondary Portal 37

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 30

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 24

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 22

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

5.2 Unocal Site

5.2.1 Unocal Treatment Plant

Construction

During peak construction activities, approximately 690 daily trips (117 peak-hour trips) would be added to the surrounding transportation network. The concurrent construction of the treatment plant portal and Zone 6 outfall would increase the number of daily trips by 138 and peak-hour trips by 17. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the treatment plant site during peak traffic hours. During the first few years of Unocal site construction, traffic leaving the Edmonds Ferry Terminal would experience delays between Pine Street and 100th Avenue W as a result of spoils hauling trucks climbing the SR-104 grades. Access to the Town of Woodway neighborhoods would experience slight delays during construction to make connections to the relocated portion of Pine Street. Pedestrians may be rerouted from sidewalks and shoulders around the project site. A higher number of accidents could occur as a result of the increased traffic within the study area associated with construction activities. However, this relates to the potential exposure to a higher number of vehicles only and should not affect the accident rates and types of accidents along the study roadways.

With construction of a structural lid over the Unocal plant site to accommodate the Edmonds Crossing project, the estimated trips at the site would be slightly lower than without the lid. Approximately 604 daily (110 p.m. peak-hour) trips were estimated during peak construction activities. However, worker trips to offsite parking areas would create additional delays in the vicinity of the selected parking areas. The potential offsite parking areas are in the vicinity of the Interstate 5/SR-104 Interchange and 236th Street SW near SR-99.

Operational

Long-term impacts would be related to the generation of automobile and truck trips by the treatment plant at full build-out. The plant would generate approximately 140 (206/262) trips per day during Year 2010 operations (206 in Year 2040 at 54 mgd, 262 in Year 2040 at 72 mgd). This would include 10 truck trips by maintenance and supply trucks (14 for Year 2040/54 mgd, 18 for Year 2040/72 mgd). Unavoidable delays of traffic would be minimized by designating specific access routes upon selection of a preferred site for the treatment plant.

5.2.2 Unocal Conveyance System

Portal 14

Construction

During peak construction activities, approximately 170 daily trips (55 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours.

Portal 14, in the Bothell area, is located within a mixed industrial and public use area. Access to the Police Station and parks could be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 11

Construction and operational impacts for this portal are the same as in the 195th Street corridor and are discussed under section 5.1.2. In addition, a pump station would be located here that would minimally increase the number of operation trips.

Portal 7

Construction

During peak construction activities, approximately 166 daily trips (53 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours.

Portal 7, in the Shoreline/Lake Forest Park area, is located within a mixed industrial and public use area. Access to the Park-n-Ride and Brugger's Bog Park could be affected.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Portal 3

Construction

During peak construction activities, approximately 76 daily trips (24 peak-hour trips) would be added to the surrounding transportation network. These additional trips would create minimal delays in traffic movement and circulation in the vicinity of the portal site during peak traffic hours.

Portal 3, in Edmonds, is located within a mixed residential and commercial area. Neighborhood activities and access to the fire station and commercial areas could be affected

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 13

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 12

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

<u>Operational</u>

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 10

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

Secondary Portal 5

Construction

There would be some delays in movement and circulation in the vicinity of the work site during construction activities at each secondary portal location.

Operational

No significant unavoidable adverse impacts on traffic would result from operation of the conveyance system.

5.3 Outfall Zones

No significant unavoidable adverse impacts on marine traffic would result from construction or operation of the Brightwater outfall.

REFERENCES

Bernstein and WSA. 1995. *Edmonds Crossing Project Discipline Report, Transportation*. Prepared for Federal Highway Administration, WSDOT, and City of Edmonds. Prepared by Robert Bernstein, P.E., and Wilbur Smith Associates, submitted by CH2M HILL, Bellevue, WA.

City of Bothell. 2003. *Capital Improvement Projects*. Retrieved September 2003 from the City of Bothell website: http://www.ci.bothell.wa.us/html/projects/capitalprojects.html

City of Edmonds. 2002. City of Edmonds Comprehensive Plan 2002. Transportation Element Update Edmonds, WA.

City of Kenmore. 2003. *Transportation Improvement Plan*. Retrieved September 2003 from the City of Kenmore website:

http://www.cityofkenmore.com/html/projects/Projects.html

City of Shoreline. 2003. *Aurora Corridor Project*. Retrieved September 2003 from the City of Shoreline website:

http://www.ci.shoreline.wa.us/cityhall/projects/aurora/index.cfm

City of Shoreline. 2002. Capital Improvement Projects. Shoreline, WA.

Lee, David. 2003. Project Manager, Snohomish County Project #RC1079. Personal communication, August 28, 2003.

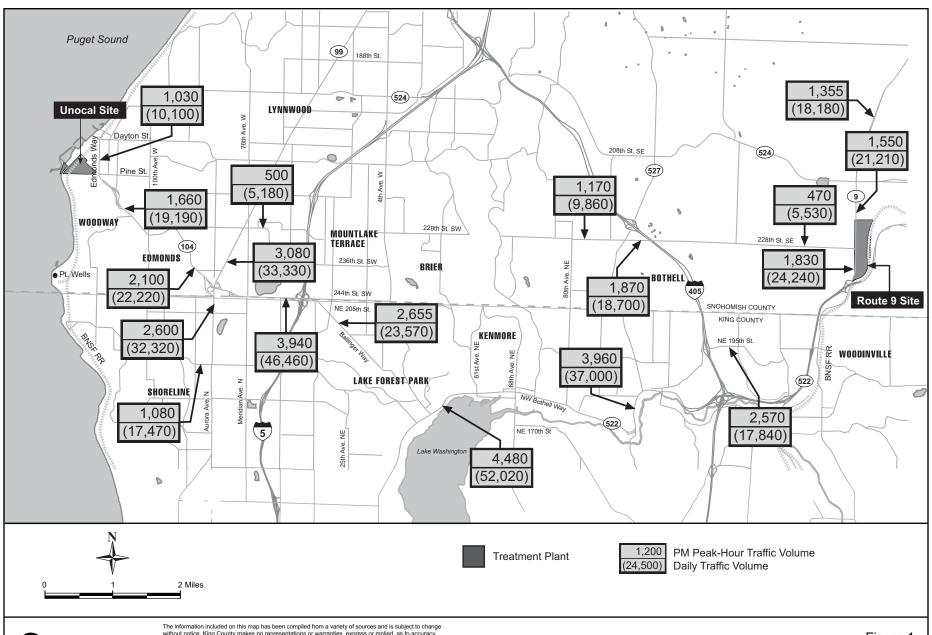
Safavian, Seyed. 2003. Transportation Manager, City of Bothell. Personal communication, September 2003.

Snohomish County. 2003. *Planned Road Project Summary*. Retrieved August 28, 2003, from the Snohomish County website:

http://www.co.snohomish.wa.us/publicwk/roads/RoadsCentral/Sno-Wood%20Rd..htm

TRB. 2000. *Highway Capacity Manual, 2000 Edition*. National Academy of Sciences Transportation Research Board Special Report 209.

TSI. 2002. *Costco Woodinville Preliminary Traffic Analysis*. Transportation Solutions, Inc. Redmond, WA. December 31, 2002.



King County
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Data Sources: King County Wastewater Treatment
Division, September 2002

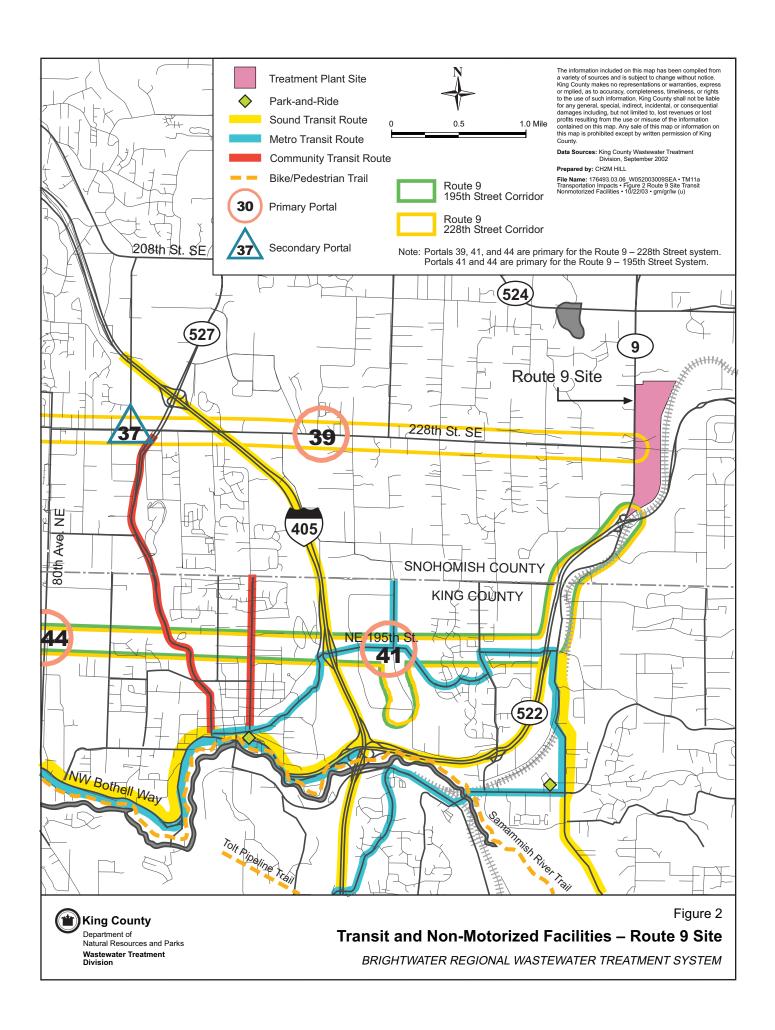
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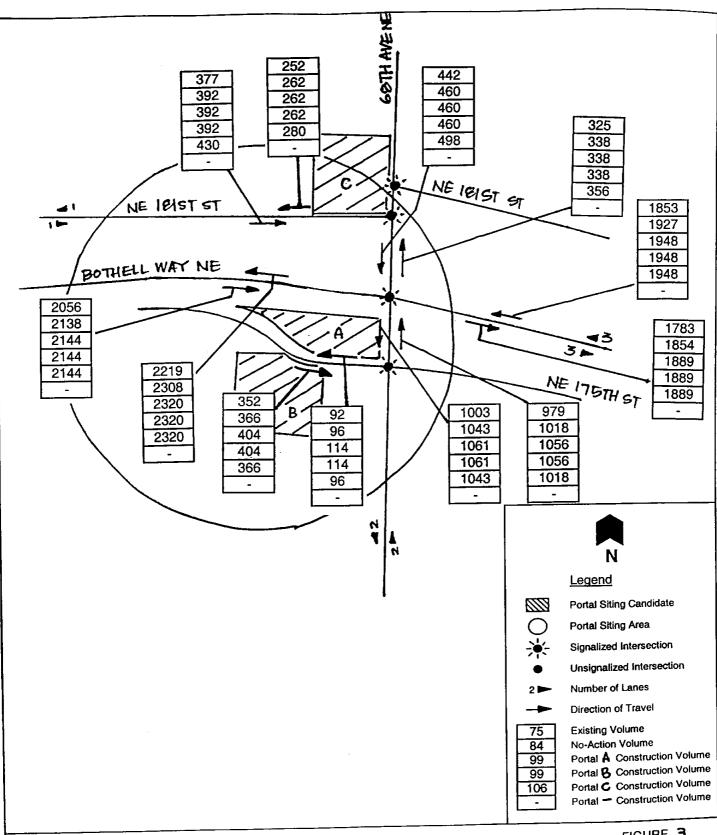
File Name: 176493.03.06 W052003009SEA • TM11a Transportation Impacts • Figure 1_Existing Traffic Conditions • 9/23/03 • gm/gr/lw (u)

Figure 1

Existing Traffic Conditions

BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

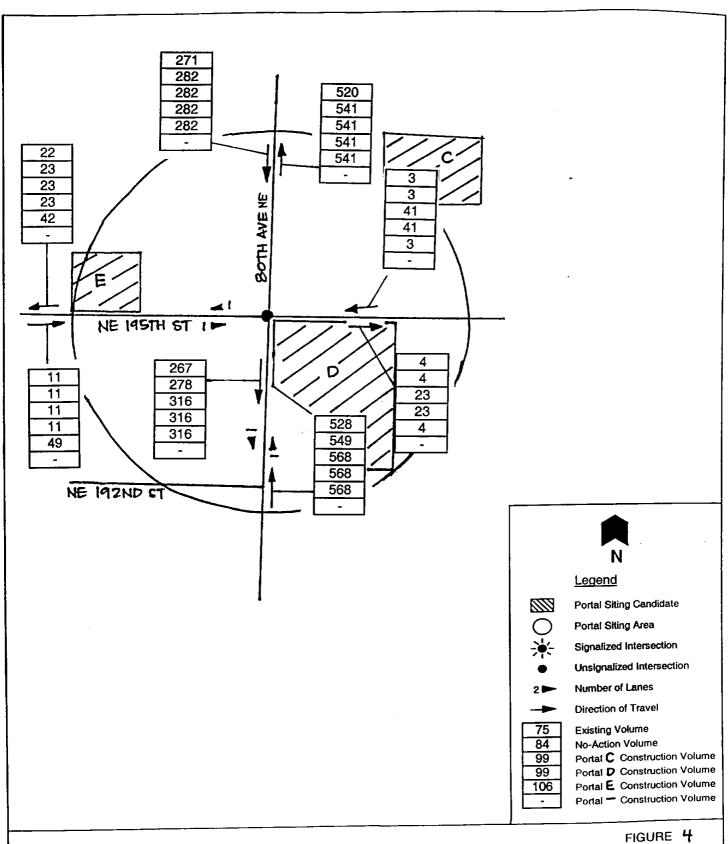




King County

Department of Natural Resources and Parks Wastewater Treatment Division FIGURE 3

Portal Siting Candidates - Portal 11
Route 9 - 195th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM



King County
Department of

Department of Natural Resources and Parks Wastewater Treatment Division Portal Siting Candidates - Portal 44
Route 9 - 195th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM

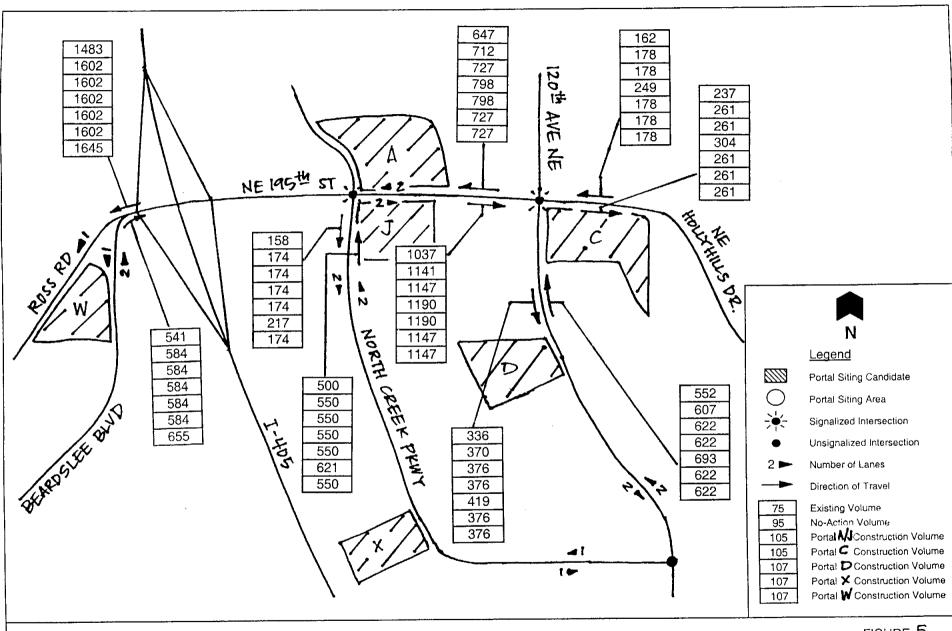
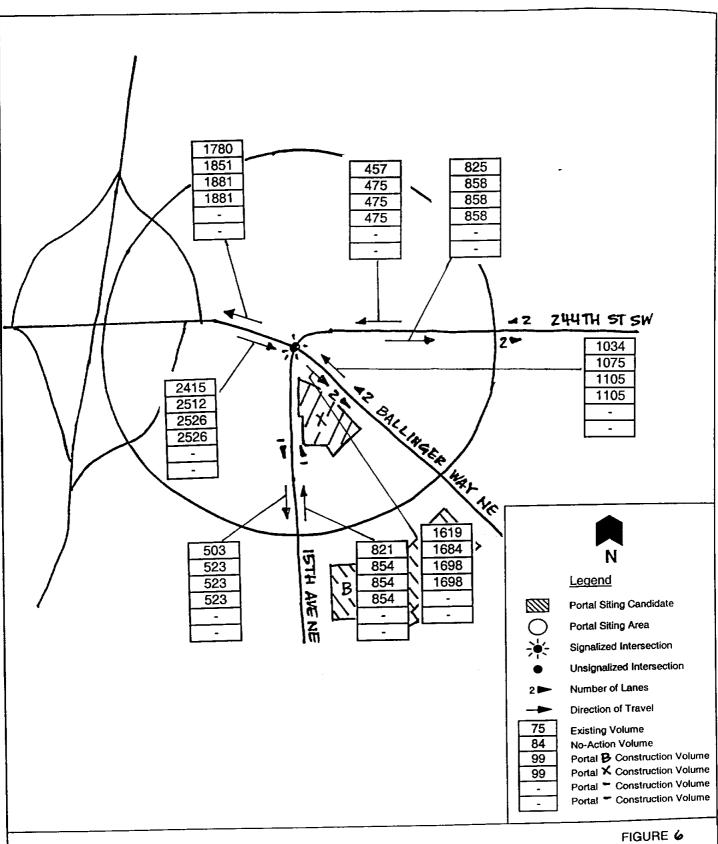




FIGURE 5

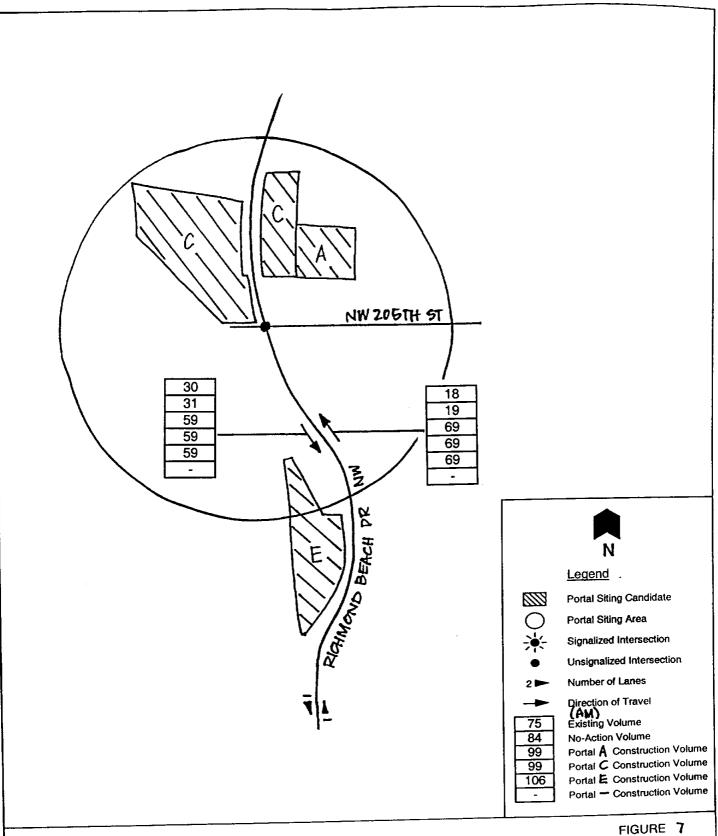
Portal Siting Candidates - Portal 41 Route 9 - 195th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM



Portal Siting Candidates - Portal 5 Route 9 - 195th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

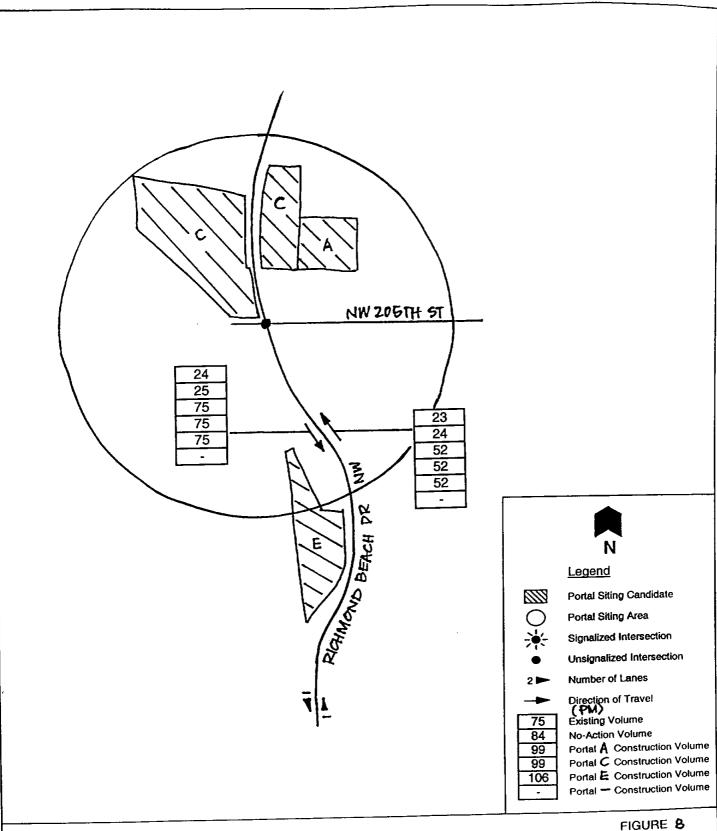


Natural Resources and Parks **Wastewater Treatment** Division





Portal Siting Candidates - Portal 19 Route 9 - 195th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

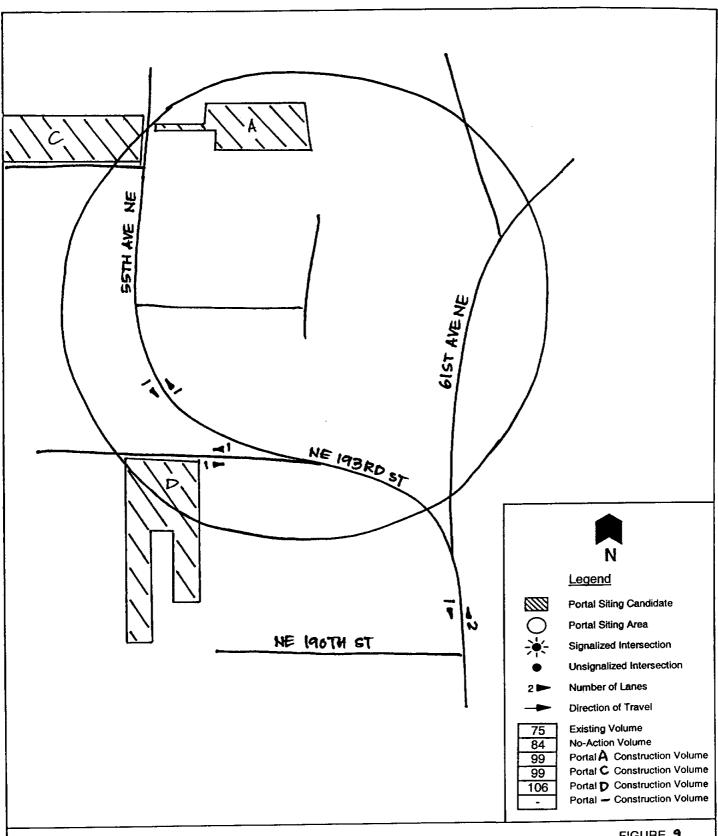




Portal Siting Candidates - Portal 19 Route 9 - 195th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM



(14) King County Department of Natural Resources and Parks **Wastewater Treatment** Division



Department of Natural Resources and Parks **Wastewater Treatment** Division

FIGURE 9

Portal Siting Candidates - Portal 45 Route 9 - 195th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

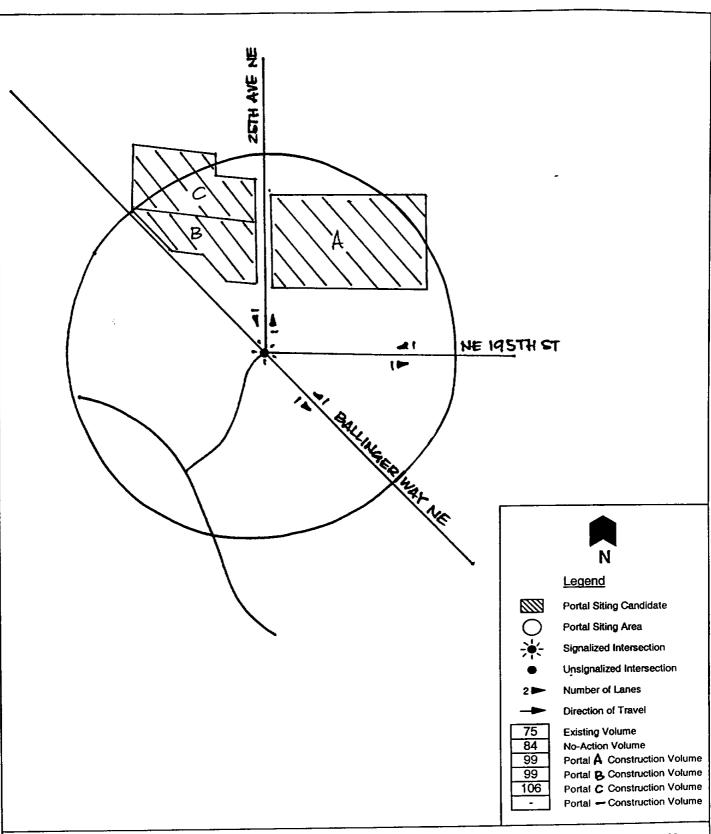




FIGURE 10

Portal Siting Candidates - Portal **7**Route 9 - 195th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM

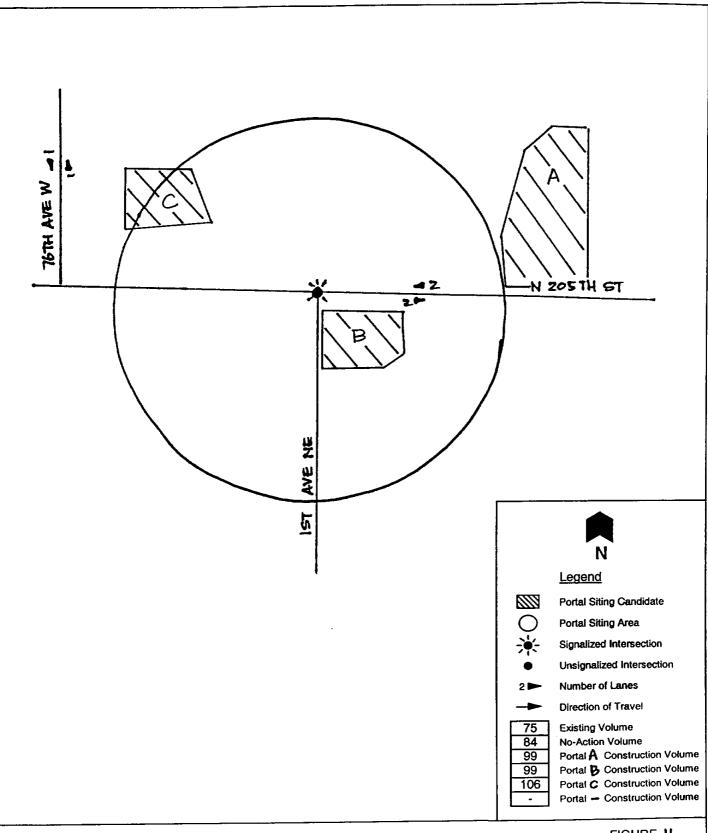




FIGURE 11

Portal Siting Candidates - Portal 27
Route 9 - 195th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM

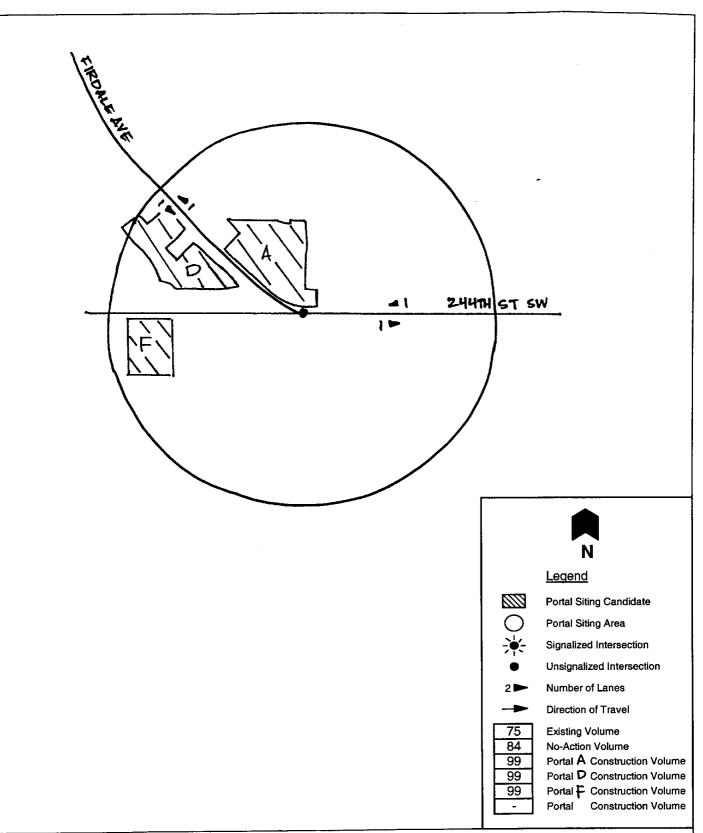
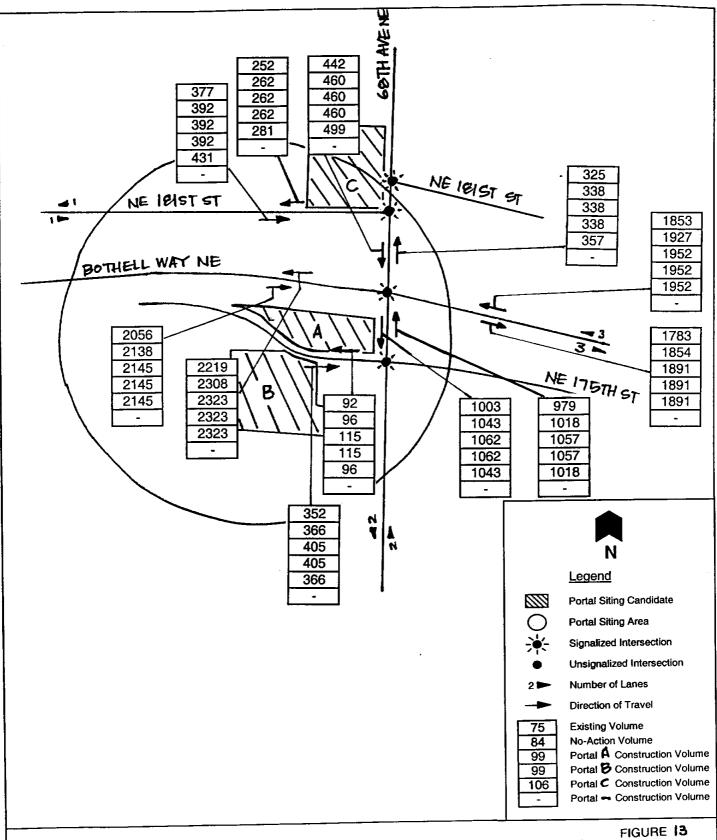




FIGURE 12

Portal Siting Candidates - Portal **23**Route 9 - 195th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM



Portal Siting Candidates - Portal 11 Route 9 - 228th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM



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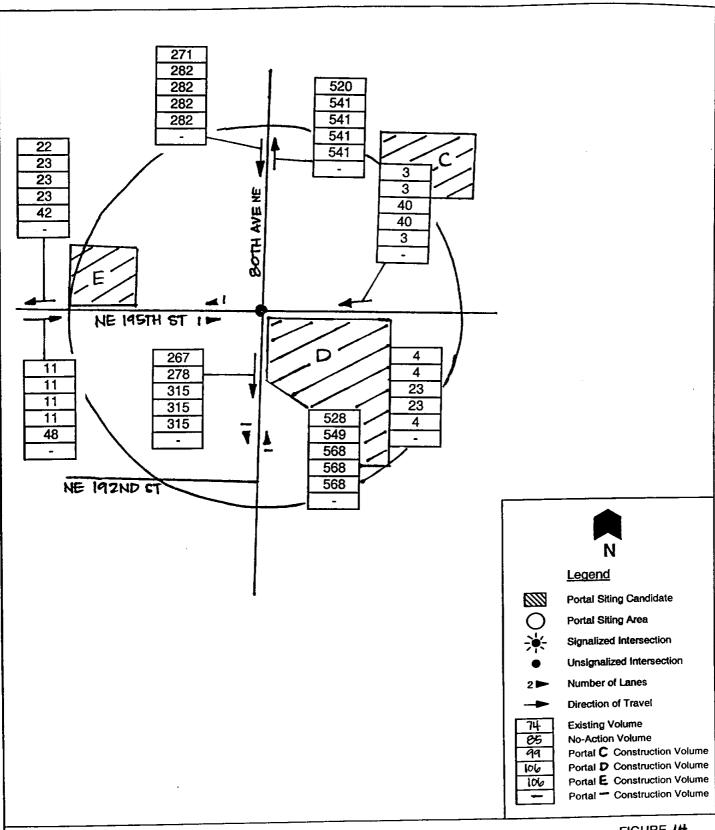
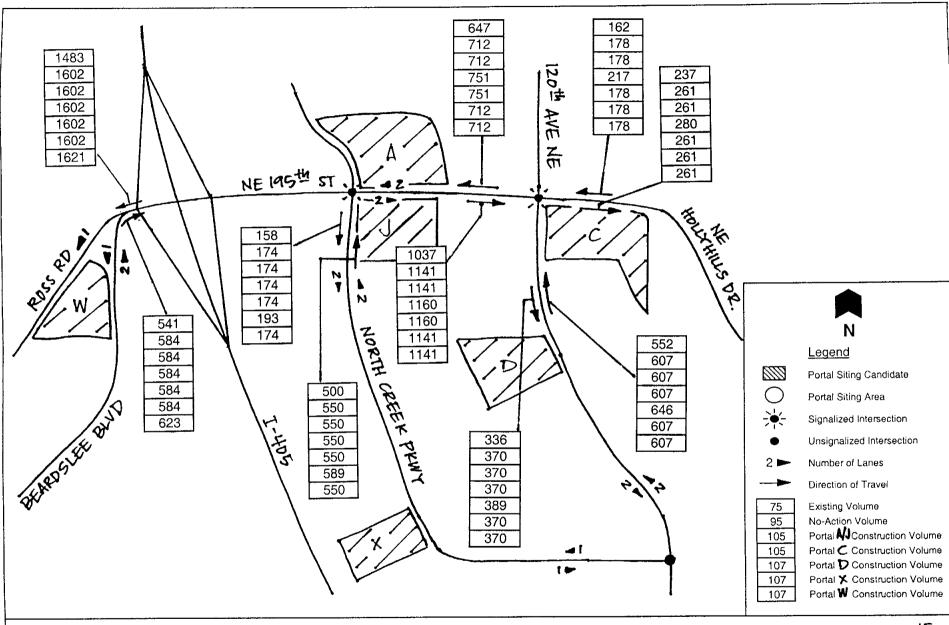




FIGURE 14
Portal Siting Candidates - Portal 44

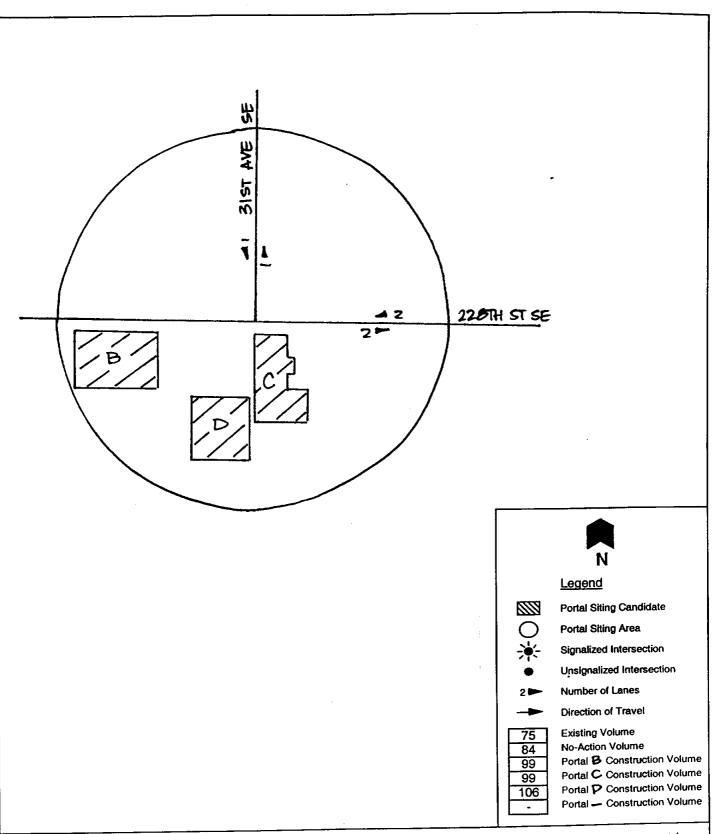
Route 9 - 228th Street System Alternative BRIGHTWATER REGIONAL

WASTEWATER TREATMENT SYSTEM



Department of Natural Resources and Parks **Wastewater Treatment Division** FIGURE 15

Portal Siting Candidates - Portal 41
Route 9 - 228th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM





Department of Natural Resources and Parks Wastewater Treatment Division

FIGURE 16

Portal Siting Candidates - Portal 39
Route 9 - 228th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM

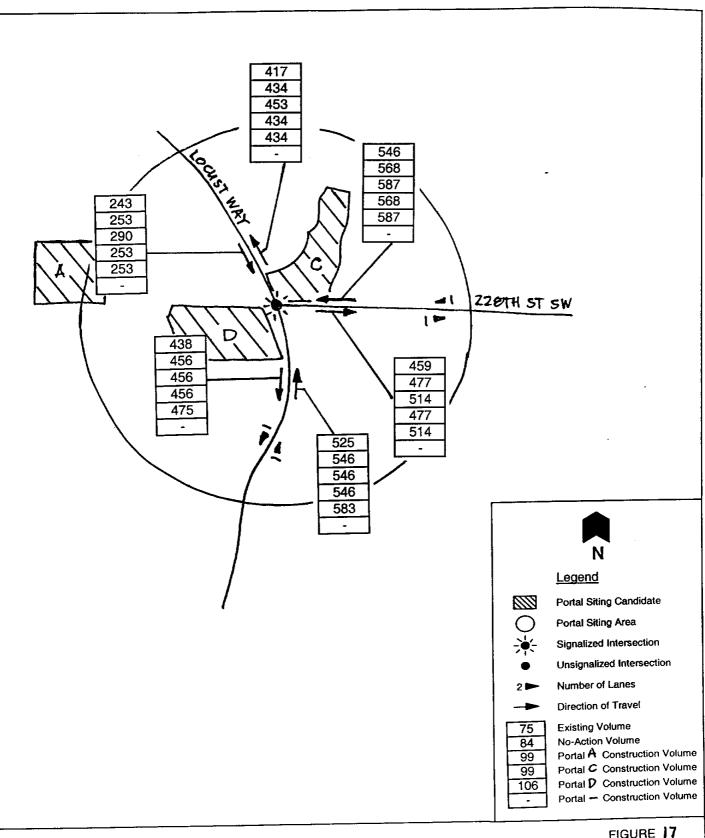
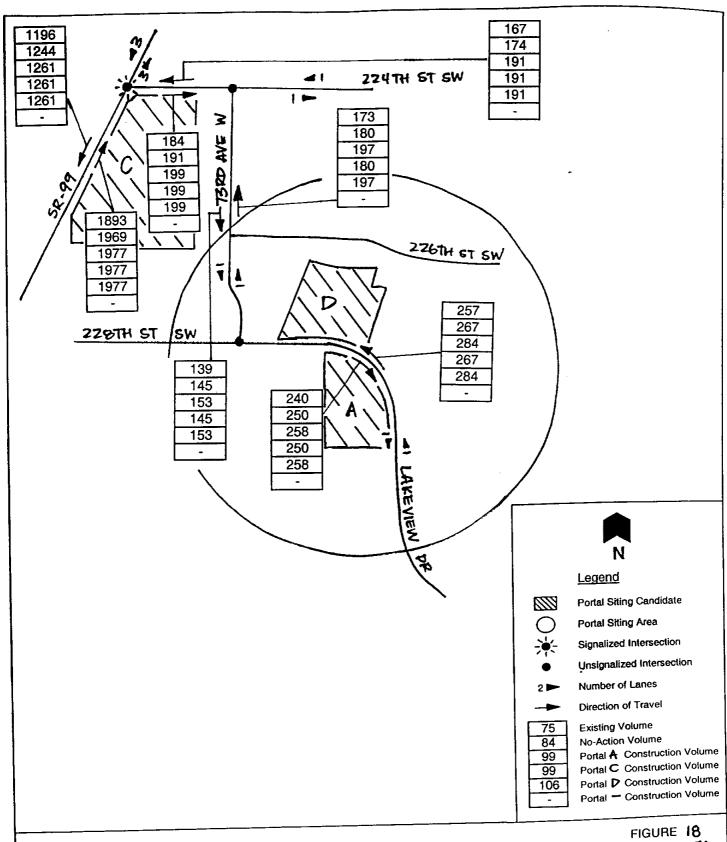




FIGURE 17

Portal Siting Candidates - Portal 35 Route 9 - 228th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM



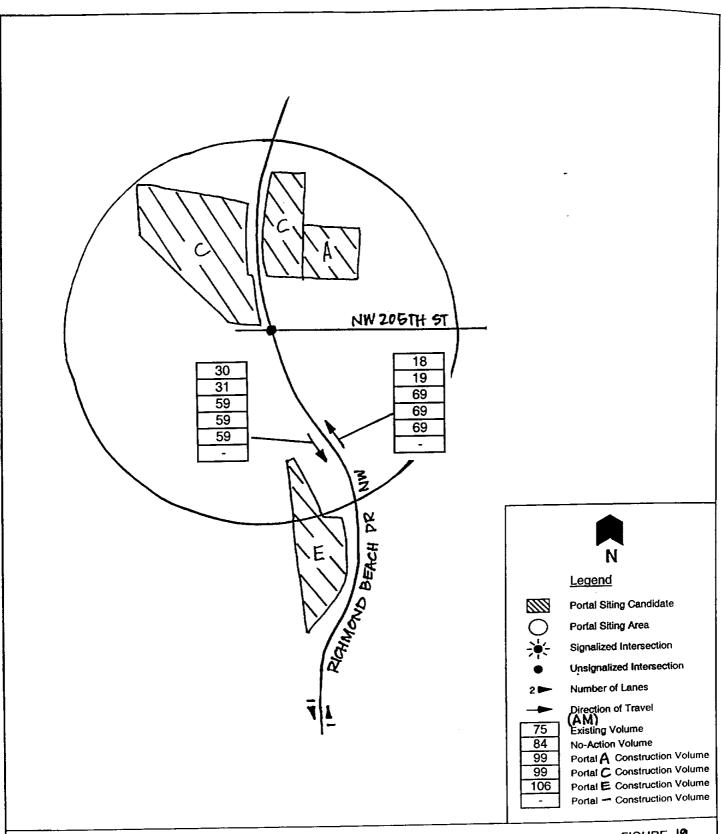
King County
Department of
Natural Resources and Parks
Wastewater Treatment

Division

Portal Siting Candidates - Portal **26**Route 9 - 228th Street System Alternative

BRIGHTWATER REGIONAL

WASTEWATER TREATMENT SYSTEM





(III) King County Department of Natural Resources and Parks Wastewater Treatment Division

FIGURE 19

Portal Siting Candidates - Portal 19 Route 9 - 228th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

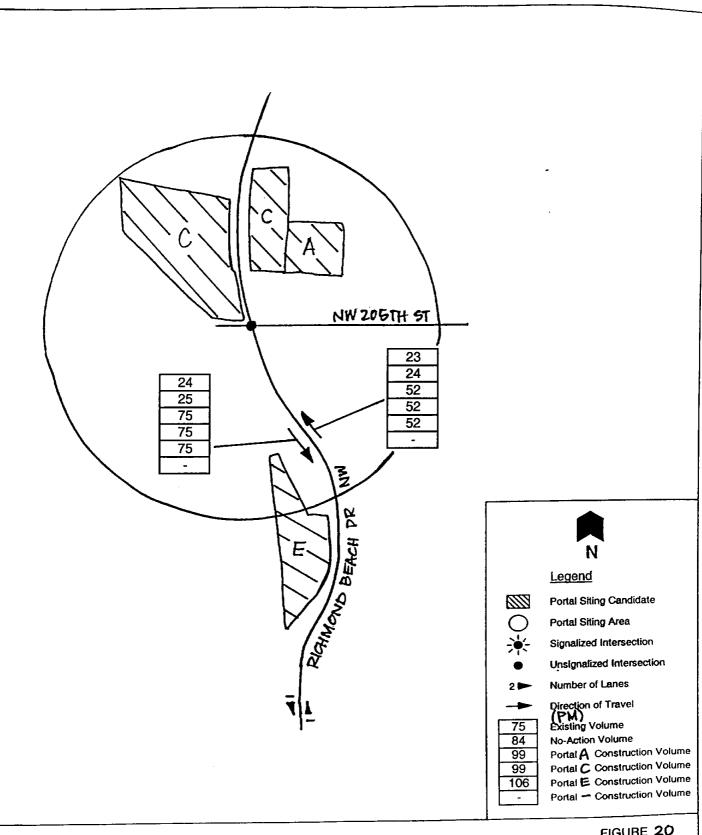




FIGURE 20

Portal Siting Candidates - Portal 19 Route 9 - 228th Street System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

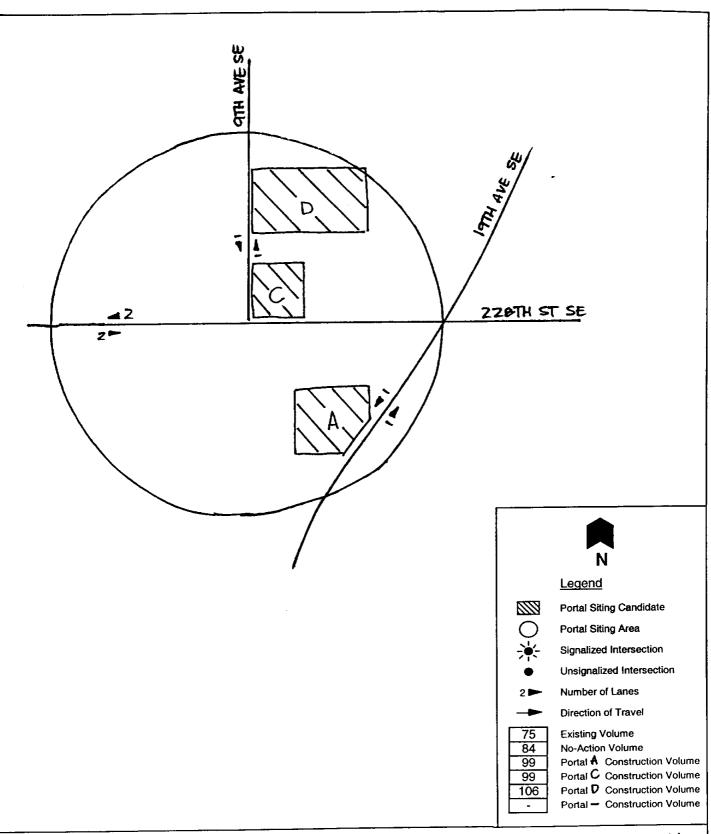




FIGURE 21

Portal Siting Candidates - Portal 37
Route 9 - 228th Street System Alternative
BRIGHTWATER REGIONAL
WASTEWATER TREATMENT SYSTEM

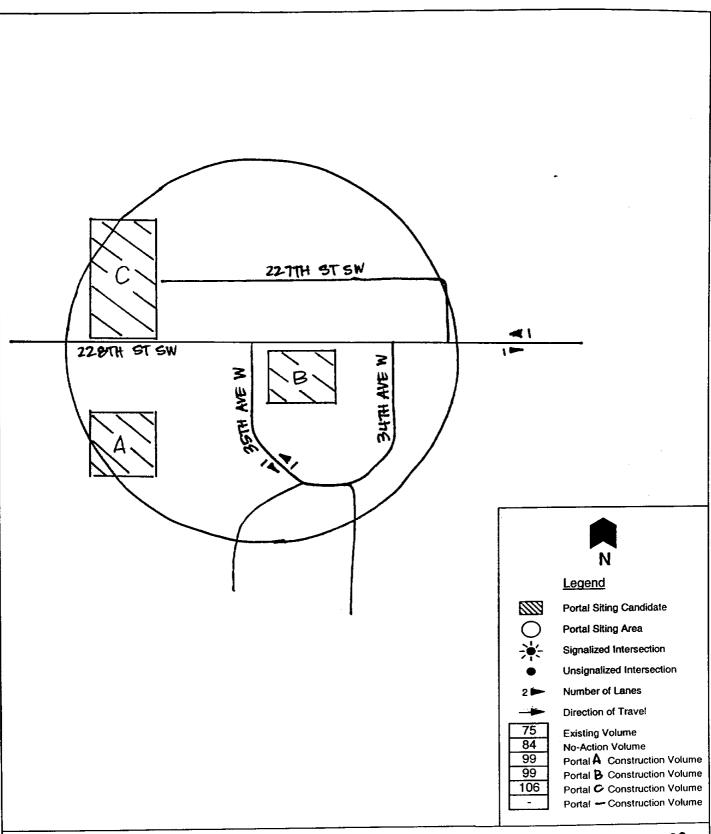




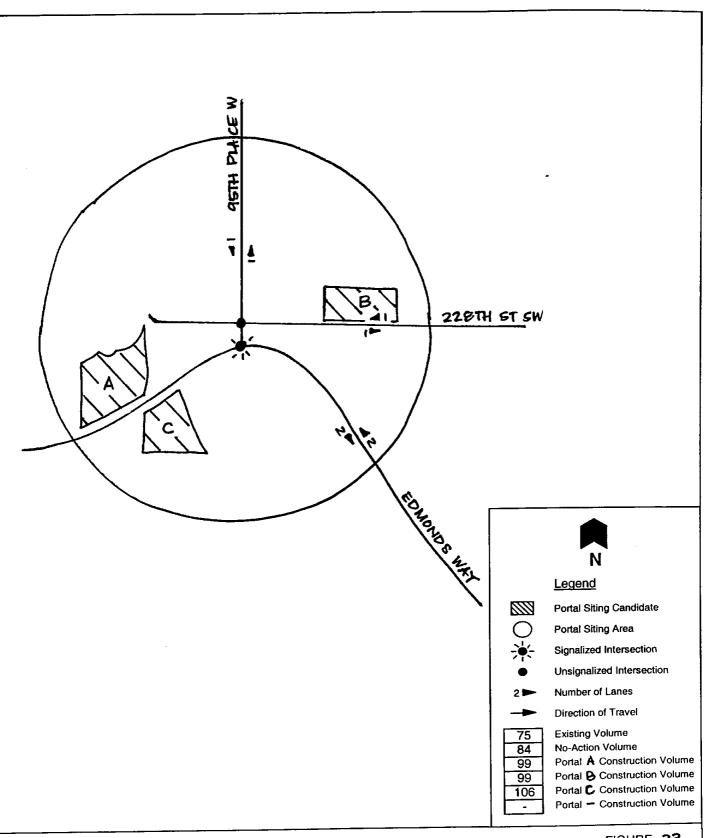
FIGURE 22

Portal Siting Candidates - Portal 30

Route 9 - 228th Street System Alternative

BRIGHTWATER REGIONAL

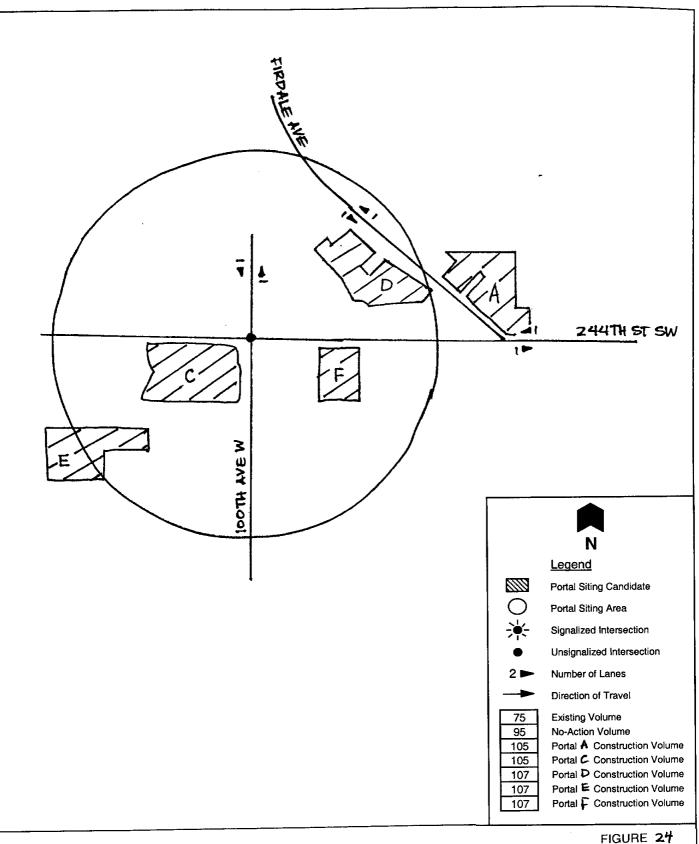
WASTEWATER TREATMENT SYSTEM



Department of Natural Resources and Parks **Wastewater Treatment** Division

FIGURE 23

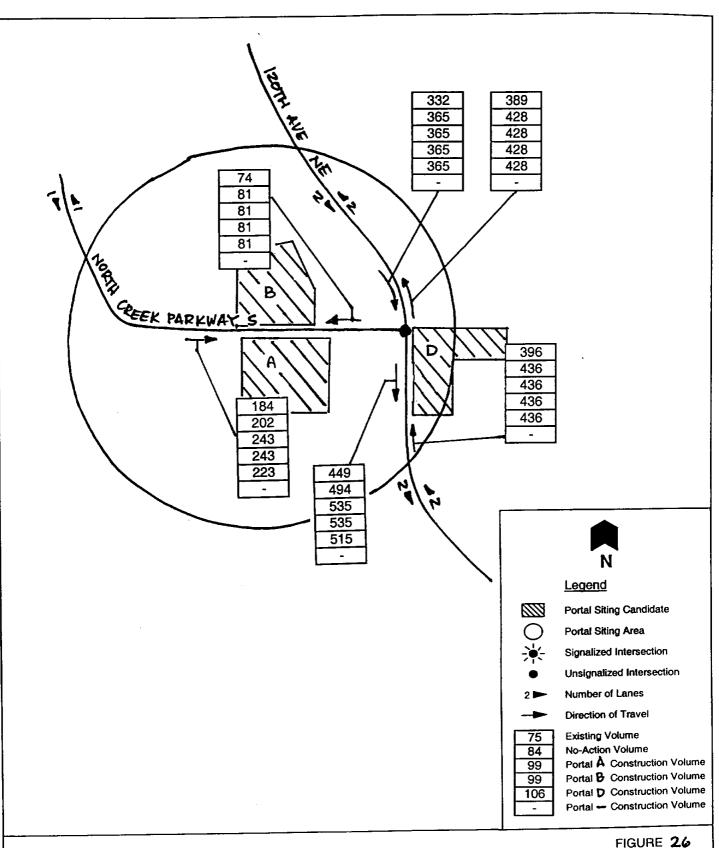
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Portal Siting Candidates - Portal 22 King County Route 9 - 228th Street System Alternative Department of BRIGHTWATER REGIONAL Natural Resources and Parks **Wastewater Treatment** WASTEWATER TREATMENT SYSTEM Division



Transit and Non-Motorized Facilities – Unocal Site



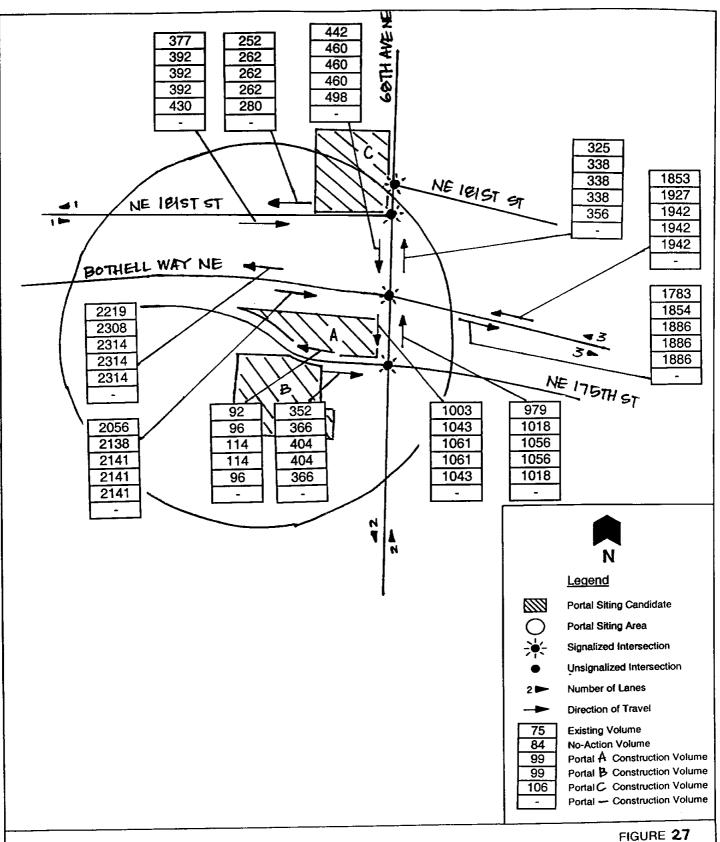


Portal Siting Candidates - Portal 14

Unocal System Alternative

BRIGHTWATER REGIONAL

WASTEWATER TREATMENT SYSTEM





Portal Siting Candidates - Portal 11 Unocal System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

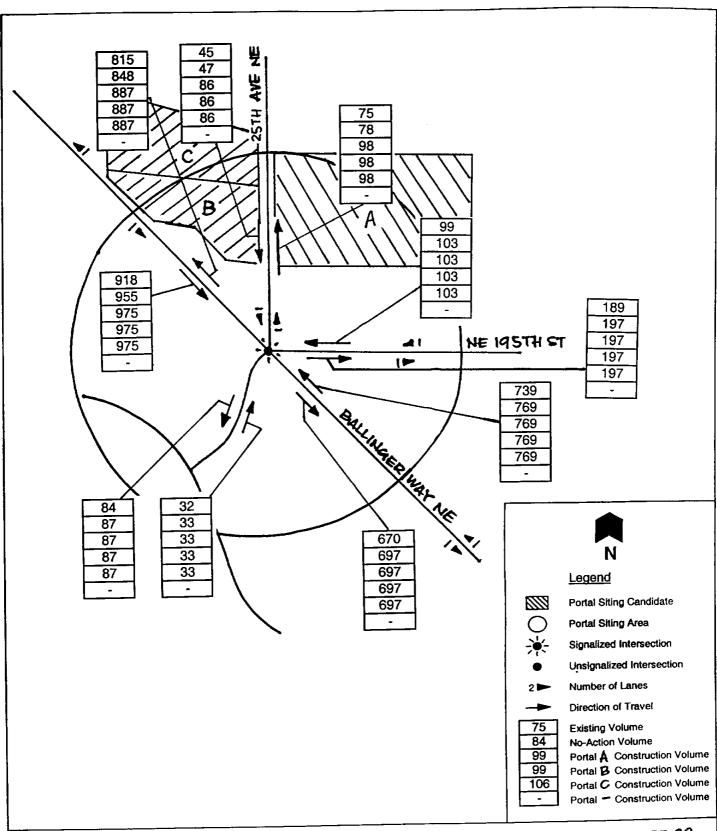


FIGURE 28

Portal Siting Candidates - Portal **1**Unocal System Alternative

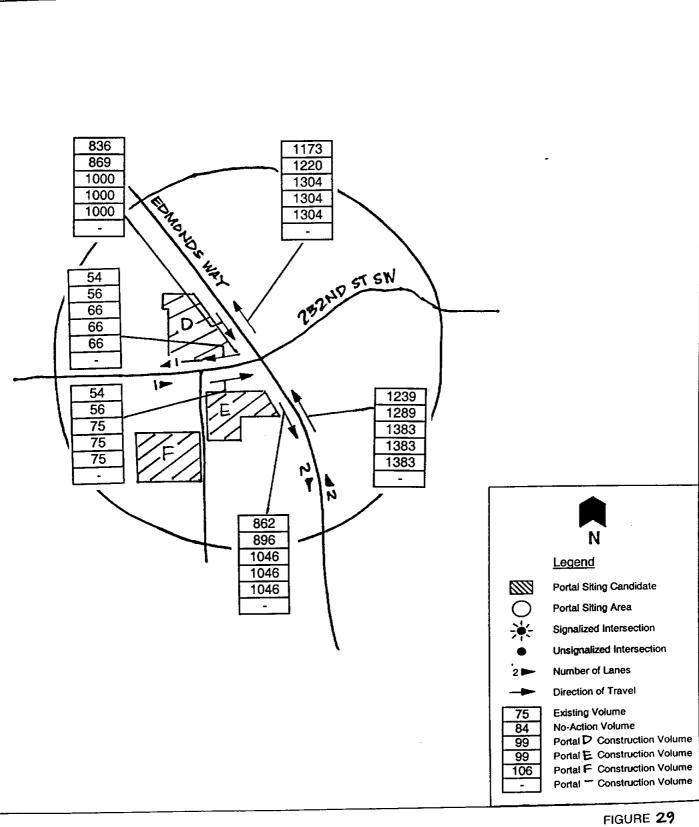
BRIGHTWATER REGIONAL

WASTEWATER TREATMENT SYSTEM



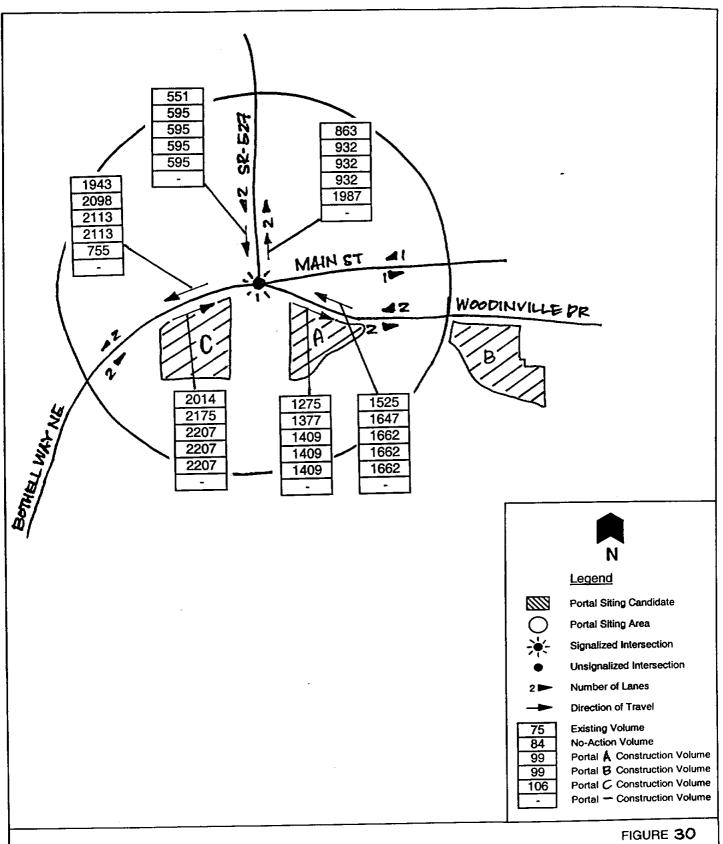
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Division



Portal Siting Candidates - Portal 3 Unocal System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM





Portal Siting Candidates - Portal 13

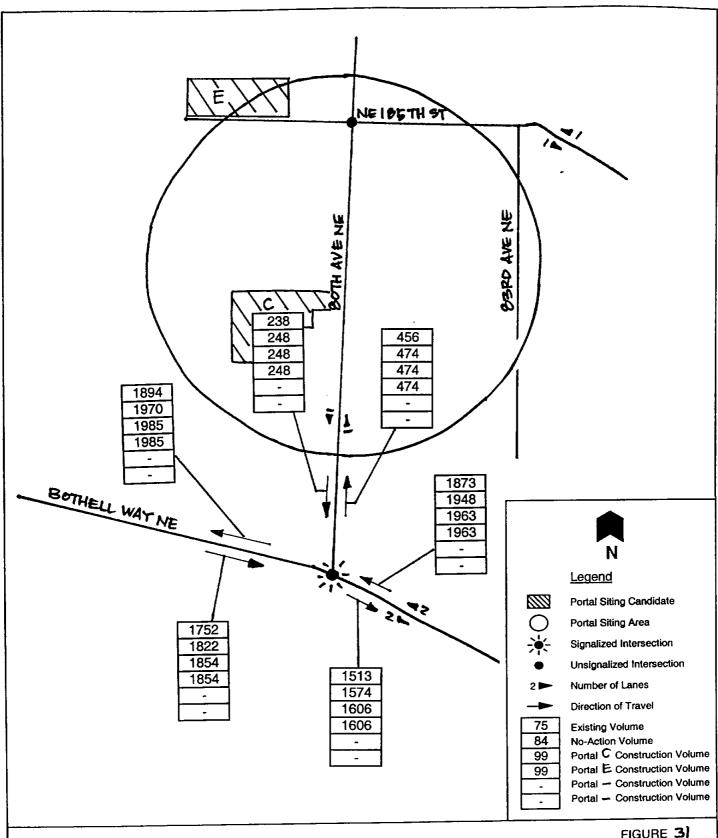
Unocal System Alternative

BRIGHTWATER REGIONAL

WASTEWATER TREATMENT SYSTEM



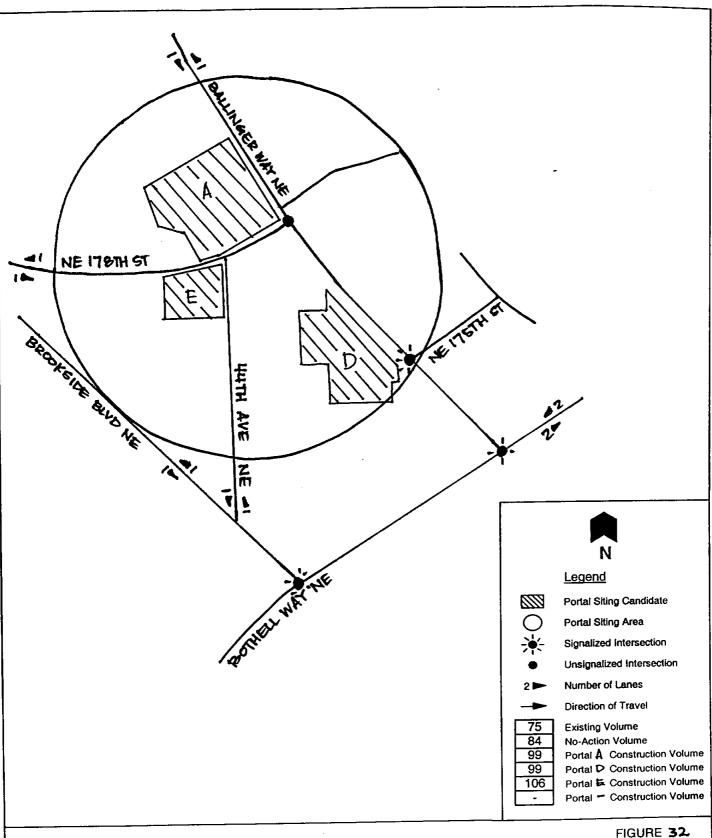
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FIGURE 31

Portal Siting Candidates - Portal 12 Unocal System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

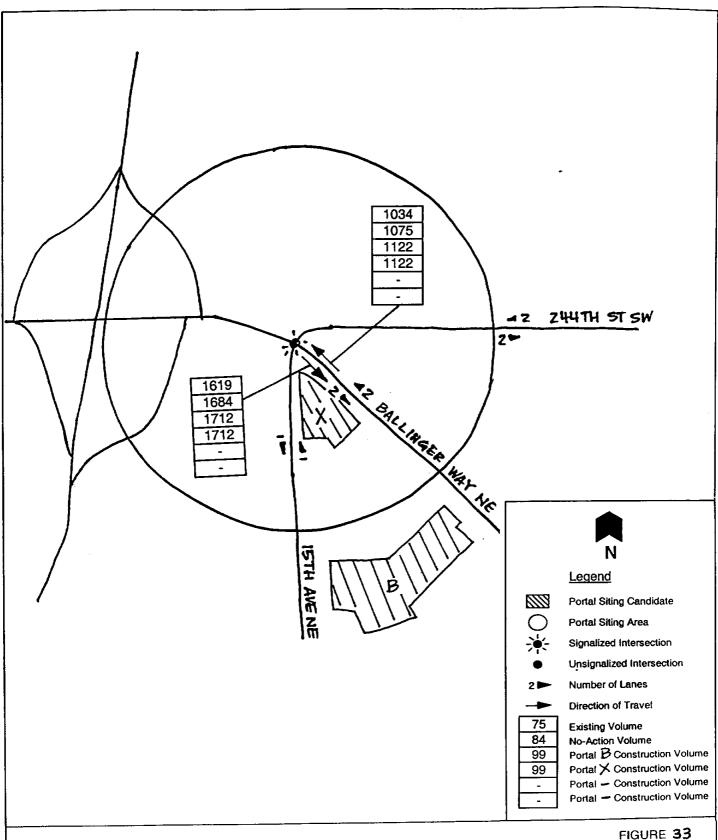


Portal Siting Candidates - Portal 10 Unocal System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM



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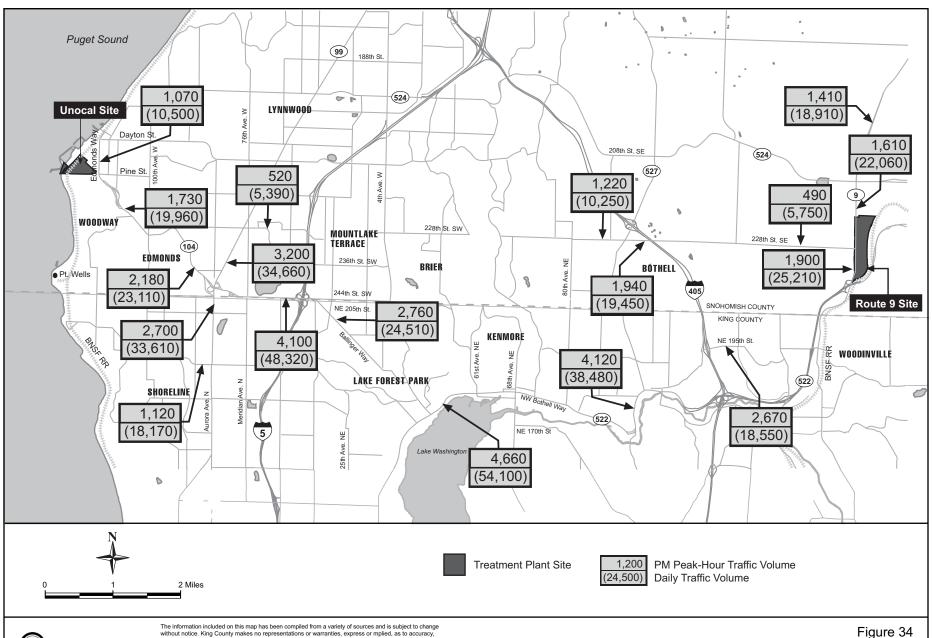
Department of Natural Resources and Parks **Wastewater Treatment** Division



Department of Natural Resources and Parks Wastewater Treatment Division

FIGURE 33
Portal Siting Candidates - Portal 5

Unocal System Alternative BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM



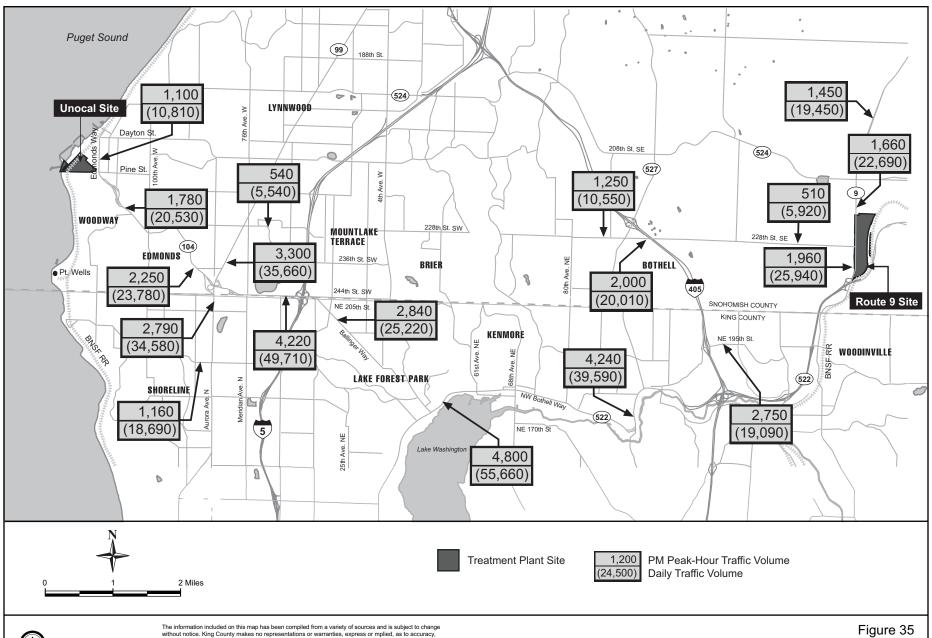
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Data Sources: King County Wastewater Treatment Division, September 2002 Prepared by: CH2M HILL

File Name: 176493.03.06_W052003009SEA • TM11a Transportation Impacts • Figure 34_NoAction_2007_ Traffic • 9/23/03 • gm/gr/lw (u)

No Action Alternative 2007 Traffic Conditions

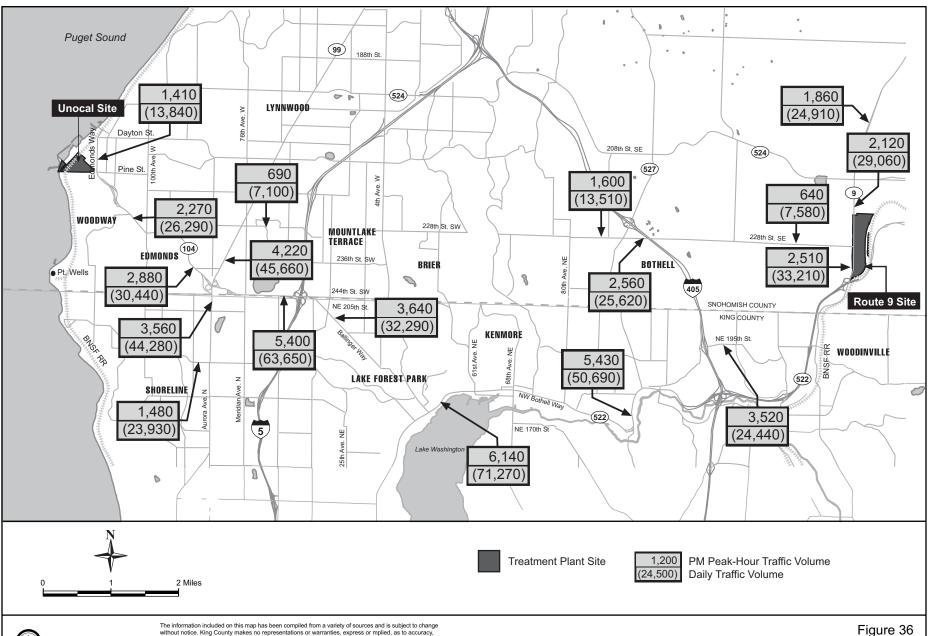


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No Action Alternative 2010 Traffic Conditions



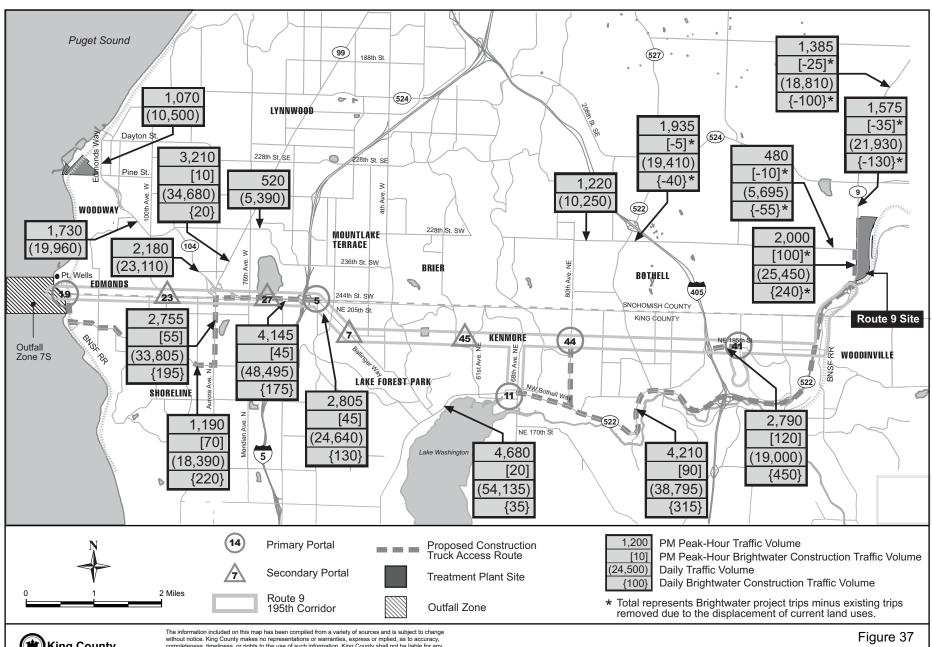
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File Name: 176493.03.06_W052003009SEA • TM11a Transportation Impacts • Figure 36_NoAction_2040_

No Action Alternative 2040 Traffic Conditions



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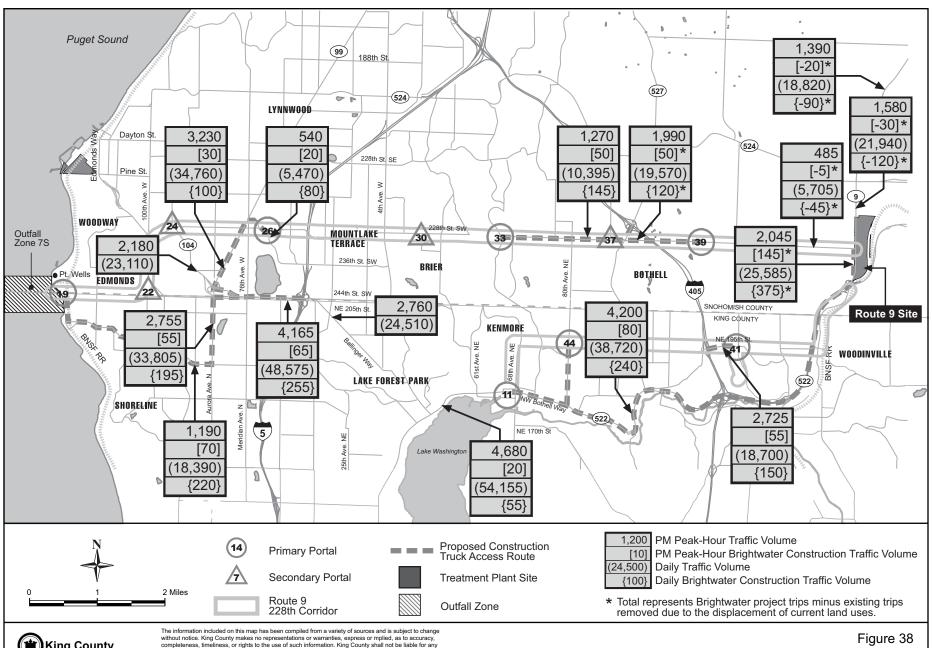
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File Name: 176493.03.06 W052003009SEA • TM11a Transportation Impacts • Figure 37_Route 9 Site 195th Corridor 2007 Construction Traffic Conditions • 10/22/03 • gm/gr/lw (u)

2007 Construction Traffic Conditions Route 9 - 195th Street Corridor



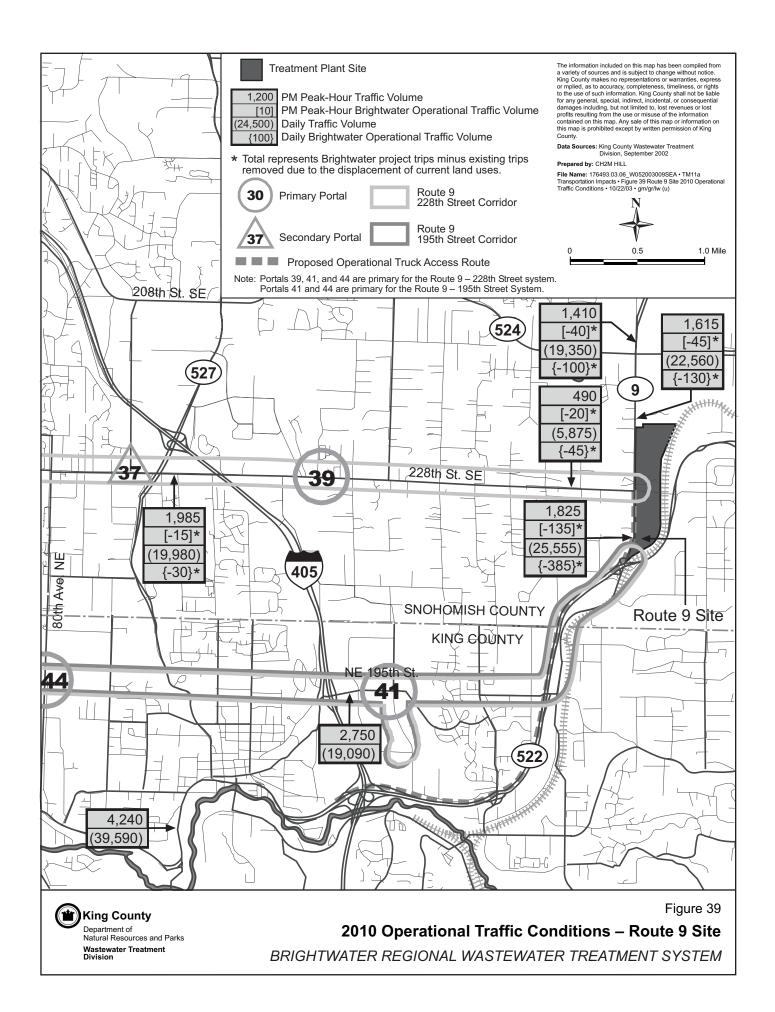
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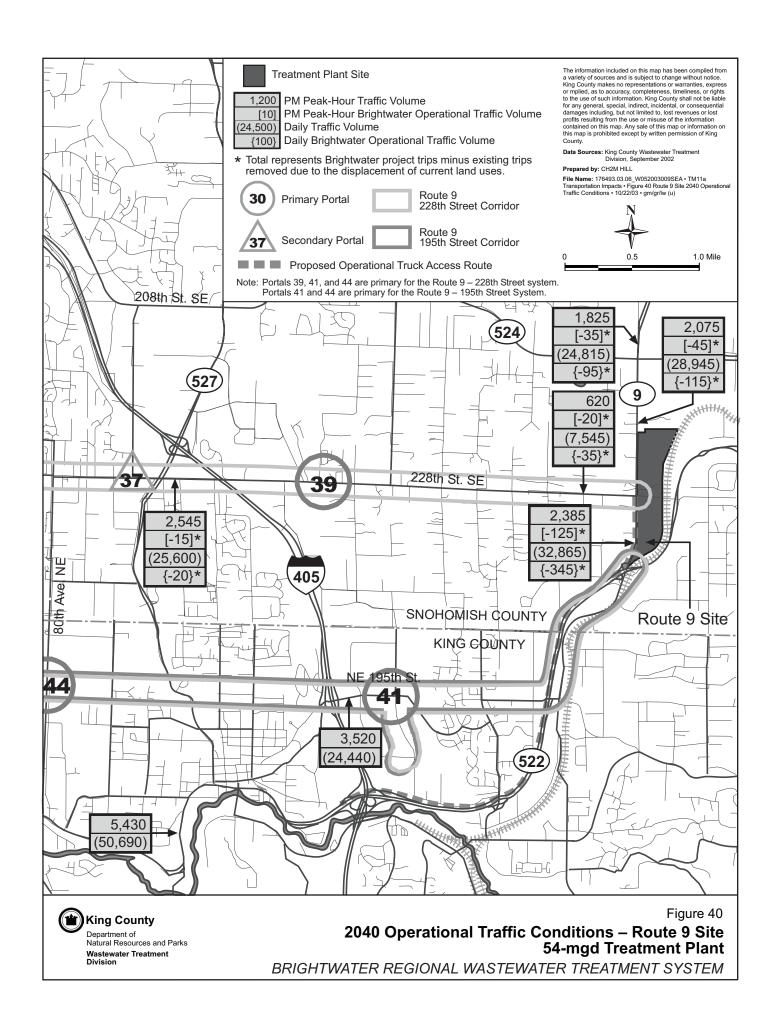
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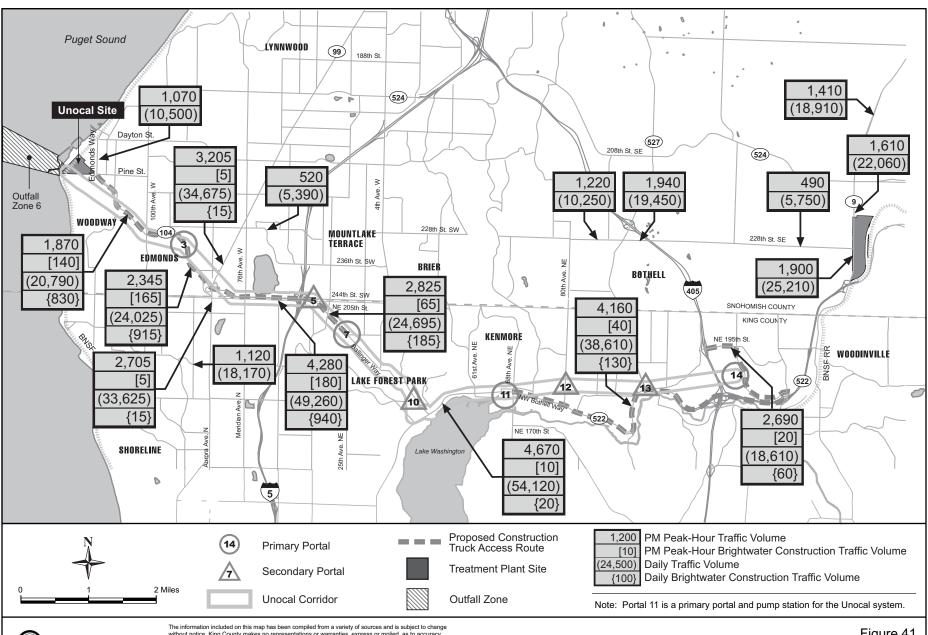
Data Sources: King County Wastewater Treatment Prepared by: CH2M HILL Division, September 2002

File Name: 176493.03.06_W052003009SEA • TM11a Transportation Impacts • Figure 38_Route 9 Site 228th Corridor 212010 Construction Traffic Conditions • 10/22/03 • gm/gr/lw (u)

2007 Construction Traffic Conditions Route 9 - 228th Street Corridor







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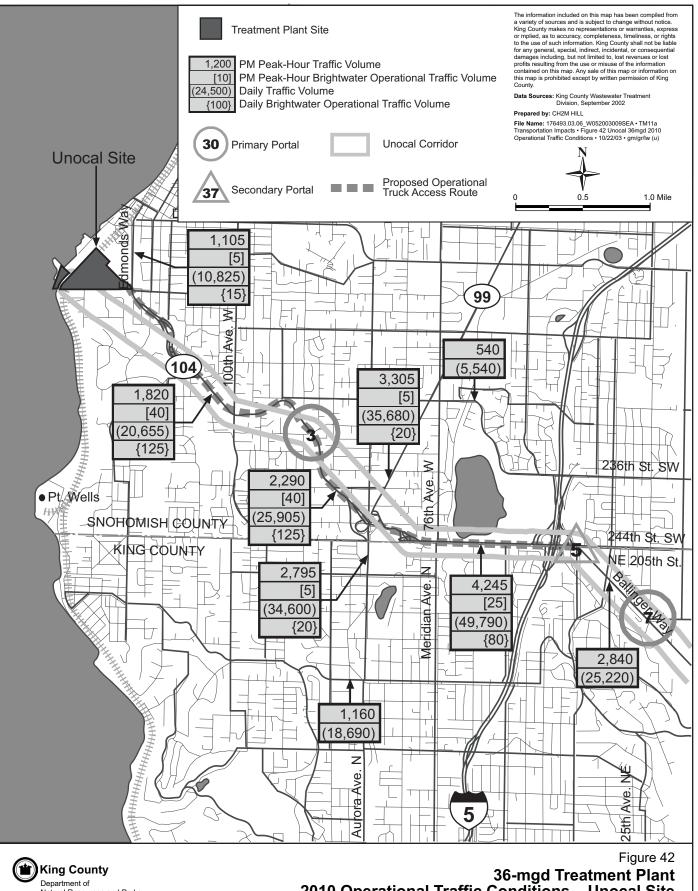
Data Sources: King County Wastewater Treatment
Division, September 2002

Prepared by: CH2M HILL

File Name: 176493.03.06 W052003009SEA • TM11a Transportation Impacts • Figure 41_Unocal 2007 Construction Traffic Conditions • 10/22/03 • gm/gr/lw (u)

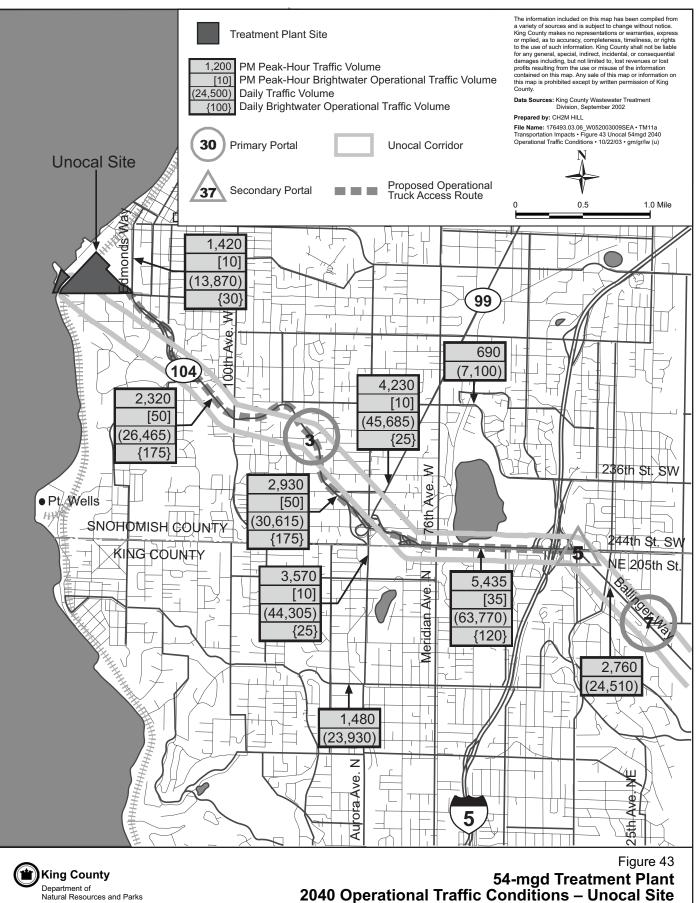
Figure 41

2007 Construction Traffic Conditions Unocal Corridor

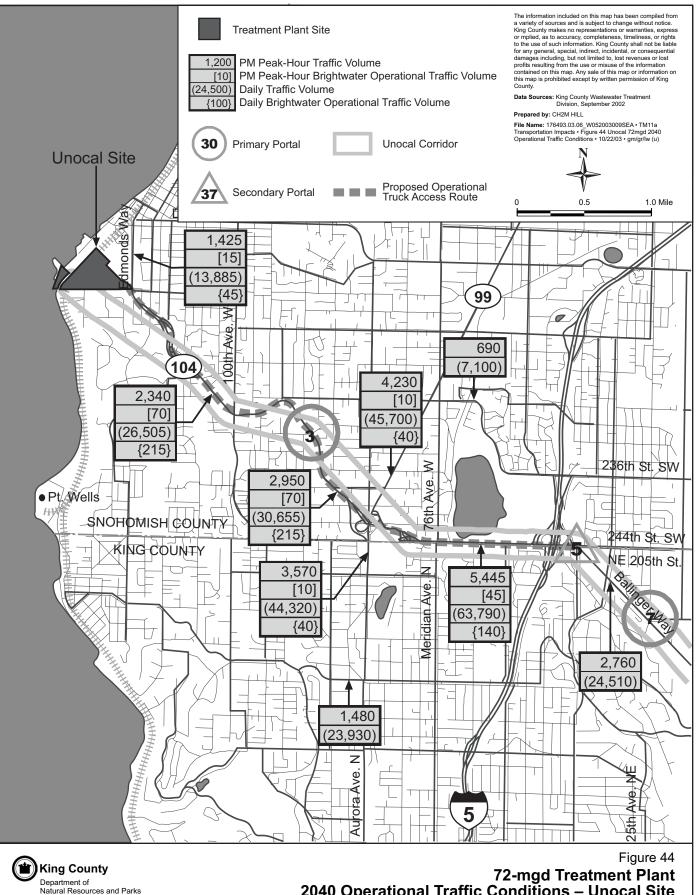


Natural Resources and Parks Wastewater Treatment Division

2010 Operational Traffic Conditions - Unocal Site



Wastewater Treatment Division



2040 Operational Traffic Conditions - Unocal Site BRIGHTWATER REGIONAL WASTEWATER TREATMENT SYSTEM

Natural Resources and Parks Wastewater Treatment Division



Department of Natural Resources and Parks Wastewater Treatment Division

Structural Lid With Edmonds Crossing Multimodal Center

Attachment A – Unocal Site Remote Truck Staging Area

TABLE OF CONTENTS

1.0	Introduction
2.0	Existing Conditions
3.0	Operational Analysis
4.0	Mitigation Ontions and results

1.0 INTRODUCTION

A remote truck staging area is being considered to minimize potential delays and queues between ferry/local traffic and construction trucks accessing the Unocal site during construction. The construction trucks will access the Unocal site via SR-104 by making a northbound left turn onto Pine Street. Construction is expected to begin in 2005 and be completed by 2010. The heaviest construction period is anticipated to occur during the year 2007.

The potential for delays and queues is due to conflicting movements between heavy vehicular traffic from ferry offloading and construction trucks at the intersection of SR-104 and Pine Street, as shown in Figure A-1.

2.0 EXISTING CONDITIONS

SR-104 is a four-lane roadway with two travel lanes in each direction and a posted speed limit of 40 miles per hour. This is the main access route to and from the Edmonds Terminal, as well as the principal arterial serving local traffic. At the existing Edmonds Ferry Terminal, there are two ferry boats providing service between Edmonds and Kingston, Washington. The two ferries are estimated to carry from 210 to 212 vehicles and they require at least 8 to 9 minutes to off-load all the vehicles from each ferry. Typically, the ferry headway from Kingston is every 40 to 45 minutes during the peak weekday afternoon period (4:00 to 6:00 p.m.). Southbound traffic on SR-104 is very heavy as a ferry is unloading. Between ferries, vehicles bound for Kingston queue up in a northbound holding lane on SR-104 (Figure A-1), leaving only one lane open for northbound through traffic. At times the ferry queue can extend well past the Pine Street intersection.

3.0 OPERATIONAL ANALYSIS

Level-of-service (LOS) and queuing analyses were conducted to assess the impact of the construction truck traffic accessing the Unocal site. The future year 2007 was used to assess potential impacts during construction. That year was used because it represents the period when the most treatment plant construction trips would be coincident with portal construction trips, thus presenting worst-case traffic conditions. Another consideration was the period of analysis during a typical day. To present a worst-case condition, the p.m. peak hour was selected because it is currently (and is projected to continue to be) the most heavily congested period during a typical weekday.

Two existing intersections and a potential truck access point were selected for the LOS analysis. One intersection, Pine Street and SR-104 (Edmonds Way), is a two-way stop-controlled intersection with the Pine Street approaches controlled by stop signs. The other intersection, 100th Avenue West and SR-104 (Edmonds Way), is signalized. The access point considered for the remote truck staging area is a pair of driveways approximately 1,000 feet east of 100th Avenue W on SR-104. This access point would operate as a stop-controlled T-intersection with right-in/right-out capabilities from westbound SR-104 (Figure A-1). These intersections and access point were analyzed with the cumulative construction traffic from the Unocal site, including construction worker, shuttle bus, and construction truck traffic. Construction worker vehicles, however, would not access the Unocal site because the workers would be bused in. Please refer to Attachment B for the Offsite Construction Employee Parking Lots Impact Analyses.

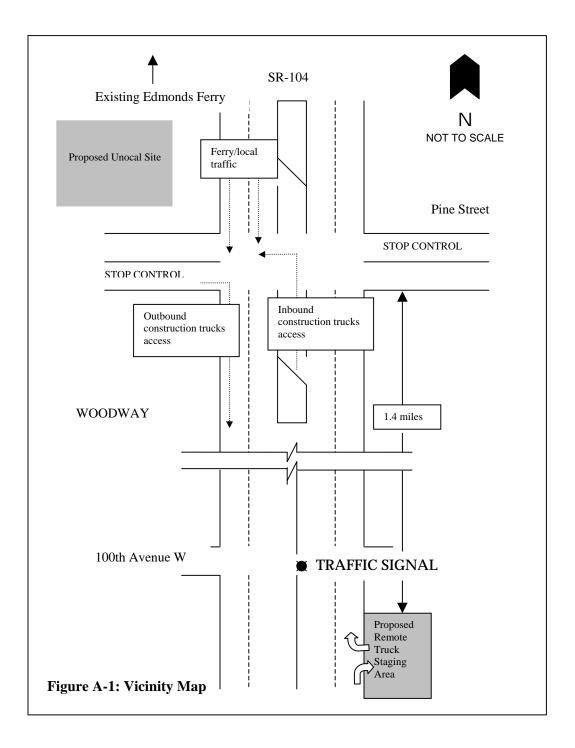
A queuing analysis was conducted for construction truck traffic to address the storage length required for either the northbound left-turn pocket at the Edmonds Way/Pine Street intersection or the remote truck staging area. An estimated 48 truck trips per hour—made up of 36 earthwork trucks, 4 single-unit trucks, and 8 shuttle buses—would be accessing the Unocal site during the peak construction period. For this analysis, shuttle buses were assumed to have the same passenger car equivalent as single-unit trucks. The queuing analysis was based on a truck arrival rate of 48 trucks per hour and a ferry traffic surge lasting 9 minutes. This analysis resulted in a queue of eight trucks during the ferry traffic surge. Of those eight vehicles, approximately six were earthwork trucks and two were single-unit trucks. Based on an earthwork truck length of 75 feet and a single-unit truck length of 30 feet, a total of 510 feet of storage length would be required to store construction traffic during each ferry traffic surge.

4.0 MITIGATION OPTIONS AND RESULTS

Five options were considered to minimize potential traffic impacts from the necessary truck storage length. Each option is briefly described below.

- Option 1: Temporarily extend the northbound left-turn pocket at the intersection of Pine Street and Edmonds Way to accommodate the necessary truck storage length. To achieve this, existing through-lane widths of 12 feet would need to be reduced to 11 feet per lane to allow for the minimum 12-foot-wide left-turn pocket. In addition, advance warning signs would be in place according to the MUTCD for the narrow lanes and construction. The current road width is adequate to accommodate the entire 510 feet of storage according to field measurements.
- Option 2: Temporarily install a traffic signal at the intersection of Edmonds Way and Pine Street. The signal would be timed to minimize queues and delays between the ferry traffic surge and the trucks. The intersection would operate at LOS C with a signal; this meets the standards of both WSDOT and the City of Edmonds. Queuing in the southbound through lanes would occur, but would not reach or impede the upstream intersection at Dayton Street.
- **Option 3:** Use 1,000 feet of the existing inside through lane south of Pine Street on Edmonds Way, shown in Figure A-1, for truck storage during ferry traffic surges. It has been observed that the westbound ferry traffic seldom extends south of Pine Street along Edmonds Way, with the exception of Friday afternoons (because of heavier weekend ferry traffic) and holidays. The observation was made using the Washington State Ferries (WSF) Ferry Cameras at http://www.wsdot.wa.gov/ferries/cameras/index.cfm to monitor ferry traffic during the p.m. peak hour. This option would require temporary restriping and advance construction warning signs.
- **Option 4:** Extend the existing northbound left-turn pocket at the intersection of Edmonds Way and Pine Street (Figure A-1) to store the required 510 feet of construction traffic. This option would require structural widening of Edmonds Way and construction of a retaining wall.
- Option 5: Stage the trucks at a remote site and dispatch them to the intersection in convoys. The candidate holding site lies east of 100th Avenue West along the north side of SR-104, about 1.4 miles from the Unocal site. This option would require a traffic control flagger to relay current ferry traffic information about the intersection of SR-104 and Pine Street to a

pilot vehicle operator. The pilot vehicle would then lead the eight trucks from the remote site to the Unocal site. When the convoy reaches the intersection, the flagger would synchronize the southbound SR-104 traffic with the incoming construction truck traffic. This would prevent construction trucks from queuing at the left-turn lane and spilling back into the northbound through lanes. The intersections would operate at LOS D, which meets the standards of both WSDOT and the City of Edmonds.



Attachment B – Unocal Offsite Construction Employee Parking Lots Impact Analyses

TABLE OF CONTENTS

Introduction	1
Inventory of Potential Offsite Lots	1
Trip Generation and Parking Requirements	1
Selection Process	
Candidate Sites	2
Trip Distribution	3
Trip Assignment	
Future Conditions	
Level-of-Service Analysis	
Mitigation Requirements	

FIGURES

- Figure 1 Employee Offsite Parking Candidate Parcels
- Figure 2 Employee Vehicle Trip Distribution
- Figure 3A Employee Vehicle Trips Candidate Parcels P1 and P2
- Figure 3B Employee Vehicle Trips Candidate Parcel P3

TABLES

- Table 1 Offsite Parking Area Requirements
- Table 2 Unocal Site Worker Trip Distribution
- Table 3 2007 P.M. Peak Hour Traffic Roadway Levels of Service—With and Without Worker/Shuttle Trips
- Table 4 2007 P.M. Peak Hour Traffic Intersections Levels of Service—With and Without Worker/Shuttle Trips

INTRODUCTION

Employee parking for construction-related workers at the Unocal site during the construction phase would not be provided onsite. To reduce traffic impacts near the site, remote parking would be provided with shuttle buses transporting workers between a remote parking location and the construction site. A process to identify potential remote parking sites was followed in order to identify a number of candidate alternatives for parking should it be required to support construction at the Unocal site. The intent of this analysis is to enable measurement of typical impact levels that may be expected from use of offsite construction employee parking.

INVENTORY OF POTENTIAL OFFSITE LOTS

A number of feasible sites were identified that met the physical needs for parking the number of vehicles that were calculated to be making the trip each shift. The list of candidate sites that met physical requirements for offsite parking were then subjected to criteria which determined their ultimate suitability based on a number of factors including proximity to major transportation facilities, compatibility with adjacent land uses, and impacts to traffic operations.

Estimates of peak construction-related employee trips were developed to assess short-term and long-term impacts of employee travel. Assumptions concerning mode share (i.e., the proportion of trips using transit, carpool, vanpool, walking, or bicycle travel) were applied to determine the actual number of vehicle trips generated during construction. Construction-related employee trips, defined as an employee in a vehicle inbound or outbound on a one-way trip, were also applied to background and construction truck traffic forecasts to determine a cumulative intersection LOS and impacts to roadway capacity during the p.m. peak-hour.

TRIP GENERATION AND PARKING REQUIREMENTS

In order to identify potential candidate parcels for offsite employee parking, the required total parking area (including stalls and lanes) was determined. This calculation was based on the peak construction activity period contained in Appendix 3-G, Construction Approach and Schedule: Plant, Conveyance, and Outfall. The number of construction workers at the peak activity level was used to compute the required area. This value was made up of workers who would be working on the treatment plant, the treatment plant portal, and the outfall. The required area of slightly less than 2 acres assumes a relatively high degree of efficiency can be achieved in parking vehicles (average 300 SF per vehicle assuming access aisle and driveway). This assumption is valid considering the coordination that can be applied to the vehicles being parked, and the consistent duration that will apply to each of the vehicles parked. Table 1 summarizes the assumptions used in determining the area required for employee offsite parking. An average car occupancy (ACO) of 1.3 was used to reflect a level of ride sharing (carpooling) that is typical in the construction industry.

TABLE 1Offsite Parking Area Requirements

Measure Description	Measure Value
Employees per day	374
Average Car Occupancy	1.3
Total Vehicle Trips (one-way)	288
Shuttle Bus Trips (one-way)	16
Average Parking Area per Vehicle	300 SF
Total Area Required	86,400 SF
Total Acreage Required	1.98 Acres

Notes:

SF = square feet

1 acre = 43,560 SF

One-way trip represents one direction (inbound and outbound) of a round trip.

Selection Process

The process used to develop a list of candidate parcels (from the list of potential candidates) followed the following steps to reduce the list of potential sites which met physical requirements to a list of viable site locations that met other criteria. This process utilized GIS analysis to limit the need for field reconnaissance by using available parcel, land use and roadway data as well as aerial orthophotography.

The following criteria were used to identify candidate parcels for further review as offsite parking:

- Candidate parking locations nearest to major Interstate and State Highway access are most desirable. (Potential sites were prioritized based on proximity to system interchanges based on ½ and ½ mile radii as illustrated in Figure 1.)
- Locations where parking activity (and associated traffic) will occur must be compatible with adjacent land use types. (Residential traffic impacts should be avoided.)
- Sites that require the least amount of development/preparation for parking are most desirable. (Potential sites should not require displacement of an existing public, commercial, industrial or residential use.)
- Access to sites by vehicles and shuttle buses should avoid impacts to background traffic operations.

Candidate Sites

Using the criteria listed above, the list of 71 potential candidate parcels was screened to eight. Additional field reconnaissance reduced this number to three primary candidates. Two of the candidate sites (Parcels P1 and P2) are within the vicinity of the Interstate 5/SR-104 Interchange. Access to both of these sites would be via 60th Avenue West/Gateway Place. The third site

(Parcel P3) is located along 236th Street SW near SR-99. Access is directly off of 236th Street SW. Candidate parcels are illustrated at Figure 1.

The existing use on Parcels P1 and P2 is vacant land. Parcel P1 is a combination of paved and gravel surfaces. This parcel currently serves as overflow parking for the Gateway Place commercial area until which time structured parking is constructed. Parcel P2 is currently a combination of gravel and grass surface. Parking currently occurs there for undetermined purposes. The existing use of Parcel P3 is church parking (Christ Evangelical Lutheran Church). Due to the limited size of Parcel P3, the average parking area per vehicle would be reduced to 180 square feet in order to accommodate the required vehicles. This would require that valet style parking be used if P3 were chosen.

Trip Distribution

Estimates of trip distribution for both sites were developed from current observations. A set of p.m. peak hour traffic counts collected in 2002 were assembled for SR-104, SR-99 and Interstate 5. Each of these counts were deemed representative for the purpose of distributing estimated worker trips. Table 2 lists the percent distribution of vehicle trips and total trips per each approach for each site.

TABLE 2Unocal Site Worker Trip Distribution

Approach (Facility and Direction)						
Candidate Parcel	SR-104	Interstate 5		SR-99		Total Trips
	East of I-5	South of SR-104	North of SR-104	South of SR-104	North of SR-104	
P1, P2						
% of Total Trips	4%	49%	42%	3%	2%	
Number of Trips	12	141	121	7	7	288
Р3						
% of Total Trips	4%	43%	36%	9%	8%	
Number of Trips	12	124	103	26	23	288

Trip Assignment

As indicated by the trip distribution, workers are expected to utilize the regional highway system to reach the candidate offsite parking locations. Using this assumption, travel routes within the vicinity would be Interstate 5, SR-104, and SR-99. These routes are illustrated on Figure 2.

Assuming these routes, worker trips were assigned to the highway network for purposes of determining whether impacts to traffic operations would occur. Trips were assigned to each roadway and to critical intersections and movements. Figure 3A depicts the trip assignment for candidate parcels P1 and P2. Figure 3B depicts the assignment for candidate parcel P3.

The shuttle bus routes which would ferry workers between the offsite lot to the construction site would follow SR-104 from whichever site were chosen. Access to the construction site by the

shuttle bus would be via Pine Street. The shuttle bus access routes are illustrated on Figures 3A and 3B.

FUTURE CONDITIONS

The future year 2007 was used to assess potential impacts during construction. This year was used as it represents the period during which the most treatment plant construction trips would be coincident with portal construction trips, thus presenting a worst case. Another consideration was for the period of analysis during a typical day. Again, in order to present a worst case condition the p.m. peak-hour was used as it is currently and is projected to be the most heavily congested period during a typical weekday.

Background traffic for 2007 was estimated by extrapolating from existing counts using a one percent annual growth rate. This rate was determined by annualizing and averaging roadway segment growth rates derived from the PSRC Regional Travel Demand Model.

Roadway projects that are programmed for completion by 2007 were also included as part of the background condition. There is one major roadway capacity improvement project along SR-99 in the City of Shoreline. It extends from N 165th Street to N 205th Street. However, no formal environmental documentation has been prepared, so it was not assumed that this project would be completed by 2007. Therefore, it would not have a major influence on traffic distribution or operations relative to how they are experienced today.

Level-of-Service Analysis

Potential traffic impacts were assessed both in terms of roadway segment level of service and as intersection level of service (LOS) letter grade (A - F). Intersection level of service describes the quality of intersection and roadway operations from a driver's perspective. It is presented in letter grades that range from A – where few vehicles experience any waiting time at an intersection to – F where vehicles on average may be waiting in excess of 80 seconds. (For a description of all of the grades in the LOS range, see Table 16-1 in Chapter 16.)

Table 3 presents the estimated 2007 roadway levels of service for key points along the roadway segments that would be used for worker and shuttle bus trips. Based on this analysis, trips relating to worker and shuttle bus trips are not expected degrade roadway level of service in the 2007 p.m. peak hour.

TABLE 3 2007 P.M. Peak Hour Traffic Roadway Levels of Service

Location	2007 No Action	2007 w/ Worker, Shuttle and Unocal Construction Trips		
SR-99, north of SR-104	С	С		
SR-99, south of SR-104	D	D		
SR-104, west of I-5	E	E		

TABLE 32007 P.M. Peak Hour Traffic Roadway Levels of Service

Location	2007 No Action	2007 w/ Worker, Shuttle and Unocal Construction Trips
SR-104, north of SR-99	В	В

In order to assess impacts to key intersections within the vicinity of candidate sites P1 and P2, the following intersections were analyzed:

- 244th Street SW/Gateway Place (signalized)
- Ballinger Way/15th Avenue NE (signalized)
- SR-104/I-5 SB Ramps (signalized)

The intersection of 244th Street SW and Gateway Place is signalized. The eastbound approach is 244th Street SW and has two left-turn lanes, a through lane, and a shared through-right lane. The westbound approach is also 244th Street SW and has a left-turn lane that continues east as a two-way left-turn lane, a through lane, and a shared through-right lane. The northbound approach is a driveway for a Shell service station and a Rite-Aid store and operates as a shared left-through-right lane. The southbound approach is Gateway Place and has a shared through-left lane and a channelized right-turn lane controlled by a Yield sign. This intersection has sidewalk, curb-and-gutter and marked crosswalks with ramps and pedestrian push-buttons across the westbound and southbound approaches only.

The intersection of Ballinger Way and 15th Avenue NE is signalized. The northbound approach is 15th Avenue NE and has one left-turn lane, a shared through-left lane, and a channelized right-turn lane controlled by a Yield sign. The southbound approach is 244th Street SW and has one shared through-left lane and two channelized right-turn lanes controlled by a signal. The eastbound approach is Ballinger Way and has two left-turn lanes, two through lanes, and a channelized right-turn lane controlled by a Yield sign. The westbound approach is Ballinger Way and has one-left turn lane, one through lane, and a shared through-right lane. This intersection has sidewalk, curb and gutter, and marked crosswalks with ramps and pedestrian push-buttons across the northbound and westbound approaches only.

The intersection of SR-104 and the I-5 SB Ramps is signalized. The east and westbound approaches have two through lanes and serve only through SR-104 traffic. Turns to I-5 ramps are provided upstream and downstream from the intersection. The southbound approach has two left-turn lanes and a direct free right-turn lane that merges with westbound SR-104 traffic west of the intersection. This intersection has no pedestrian accommodations and two to eight feet wide shoulders.

Major intersections near candidate site P3 are either interchange free-flow movements or are unsignalized movements. Therefore, only roadway LOS analysis was performed, as shown in Table 3.

TABLE 42007 P.M. Peak Hour Traffic Intersections Levels of Service

	2007 1	2007 No Action		ker, Shuttle and struction Trips
Intersection	LOS	Delay (seconds)	LOS	Delay (seconds)
Key Intersections relating to candidate parcels P1 and P2				
244th Street SW/Gateway Place	В	11	В	14
Ballinger Way/15th Avenue NE	E	66	E	75
SR-104/I-5 SB Ramps	С	32	D	44

These intersections were analyzed with the cumulative construction traffic from the Unocal site. This included construction worker, shuttle bus, and construction truck traffic. As was previously stated, the analysis was designed to depict a worst case future traffic condition. The evaluation indicates that, if all projected worker/shuttle trips were to be made to P1 or P2 candidate parcels (based on the worst case condition), no intersections would operate below the jurisdiction's acceptable LOS standard in the 2007 p.m. peak hour. The intersection of Ballinger Way (SR-104) and 15th Avenue NE would remain at LOS E, with an estimated increase in average delay from 66 to 75 seconds. The intersection of SR-104 and the I-5 Southbound Ramp terminus would degrade from LOS C to LOS D with an additional 12 seconds of estimated average delay (from 32 seconds to 44 seconds). And the intersection of 244th Street SW and Gateway Place would remain at LOS B with an additional three seconds of estimated average delay (from 11 seconds to 14 seconds).

Candidate parcel P3 would not be expected to impose operational impacts on signalized intersections as would be the case with P1 and P2. This is due to the situation that access to the P3 location would be made via free-flow interchange movements (such as the SR-99/SR-104 interchange) or via movements with adequate capacity to serve additional trips. Access to the P3 site off of SR-99 would involve delay only for the worker/shuttle trips.

An alternative is being considered that would place a structural lid over the treatment plant at the Unocal site to accommodate the Edmonds Crossing project. If this alternative was selected, the peak construction of the structural lid with the treatment plant would require 442 more construction workers than the peak construction of the treatment plant by itself. The increase in construction workers would require that at least two candidate parcels be used together. As a result, the intersection and roadway impacts would be greater surrounding the candidate parcel sites.

MITIGATION REQUIREMENTS

Impacts as a result of travel relating to employee offsite parking would be temporary and most likely would not be of the magnitude estimated by the analysis (representing worst case conditions). Since the impacts would be temporary, the focus of mitigation should be on managing the trips that are made. Prior to mitigation actions, potential conflicts with existing use

of candidate parcels should be investigated further. The following measures could be used for mitigation as warranted depending on the actual impacts experienced during the period of construction.

- Transportation Management Plan (TMP) Develop a plan, in coordination with other
 construction traffic management activities, that accomplishes the following: minimize the
 number of worker vehicle trips by ridesharing; control the time-of-day trips are made to
 ensure they are not made during peak weekday travel hours; control access routes used for
 worker trips to avoid points of congestion and to ensure trips are made using appropriate
 routes.
- 2. Utilization of multiple parking locations Consider using a combination of candidate parcels to relieve local impacts to intersection levels of service. This could be accomplished by using a combination of either candidate parcel P1 or P2 and P3. Assignment of individual worker trips to each location should follow appropriate criteria such as: minimizing vehicle miles traveled; optimal balance between access routes, shift turnover logistics, peak hour traffic avoidance, etc.